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*The SfB System and the Information
Problems of the Building Industry*

DARGAN BULLIVANT

*Some Implications of the New Library Association
Examination Syllabus from the Special Library
Viewpoint*

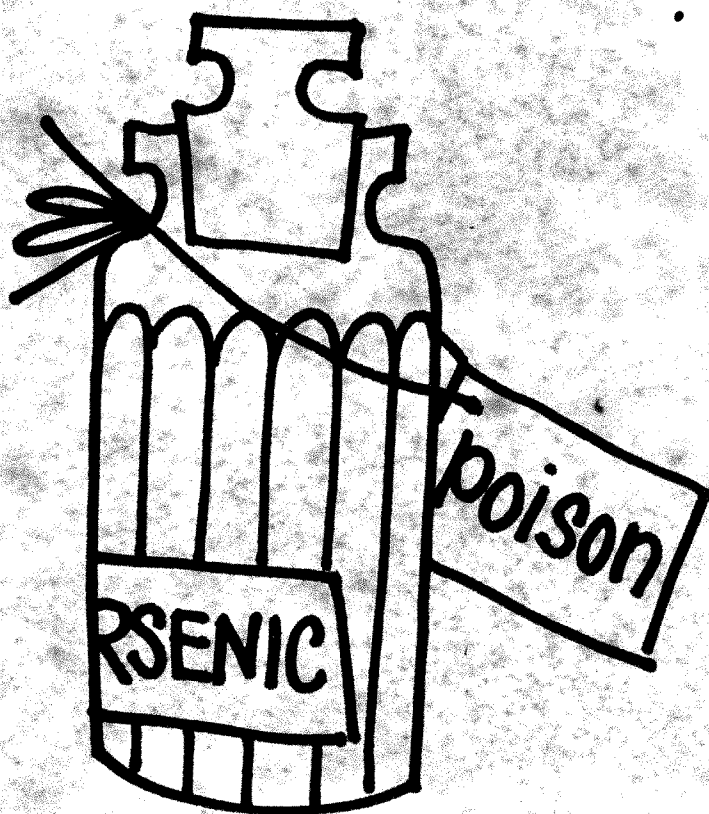
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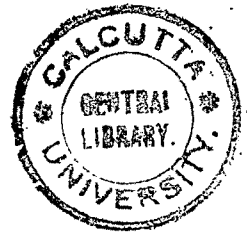
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ASLIB PROCEEDINGS

incorporating Aslib Information



Volume 15

January 1963

Number 1

ASLIB CALENDAR 1963

January

- MON.21. Winter meeting at Aslib, 5 for 5.30 p.m. 'Machines that interact with men', by G. Pask.
- TUE.22. Chemical Group meeting at Aslib, 6 p.m. 'The work of the British Chemical Plant Manufacturers Association', by J. L. Good.
- THUR.24. Economics Group meeting at Aslib, 3 p.m. 'The staff and departments at headquarters'.
- FRI.25. Technical Translation Group annual general meeting at Aslib, 2.30 p.m.
- WED.30. Economics Group visit to Marks and Spencer Ltd. Electronics Group visit to Patent Office. See paragraph below.

February

- MON.4. Chemical Group meeting at Aslib, 6 p.m. 'The work of the technical press', by W. G. Norris.
- TUE.5. One-day conference on Aslib Cranfield Investigation at Royal Aeronautical Society, 10 a.m.
- WED.6. Midlands Branch meeting, Engineering Centre, Birmingham, 6.30 p.m. 'The British Technology Index', by E. J. Coates. Economics Group visit to Morgan Crucible Commercial Intelligence Section.
- TUE.12 - WED.13. Course on work with patents, at Aslib.
- WED.20. Economics Group visit to BBC Television Centre.
- THUR.21. Winter meeting at Aslib, 5 for 5.30 p.m. 'Getting and using scientific information for the *Financial Times*', by B. C. Boltz. See paragraph below.
- WED.27. Economics Group visit to County Hall.

March

- MAR.14. Aslib one-day conference on co-ordinate indexing systems. See paragraph below.
- THUR.21. Winter meeting at Aslib, 5 for 5.30 p.m. 'The British National Film Catalogue and its contribution to information', by B. Chibnall.
- MON.25. Midlands Branch annual general meeting, Birmingham.

April

- FRI.5 - SUN.7. Aeronautical Group and Engineering Group joint annual conference at Cranfield. See paragraph below.

Aslib Evening Meeting

The February evening meeting will be held on Thursday 21st February, when Mr B. C. Boltz, Scientific Editor of the *Financial Times*, will speak on 'Getting and using scientific information for the *Financial Times*'. Mr A. E. Cornfield, Information Officer of the Petroleum Division, British Petroleum Company Limited, will be in the chair.

Mr Boltz will discuss the problems—legal problems, for example—met with in his daily work of confirming news items likely to be of interest to the paper's readers. He will describe the work of operating the *Financial Times* scientific information service for inquirers, and he will invite questions from his audience.

The meeting will take place at 3 Belgrave Square, London SW1, at 5.30 p.m. Tea will be served at 5 p.m. Those who wish to attend should fill in the form circulated with this issue of *Aslib Proceedings*, and return it to Aslib not later than Monday 11th February.

Scottish Branch

The Branch Committee have had to accept, regretfully, the resignation of their Hon. Secretary, Mr Harry Greenshields, owing to pressure of work and for health reasons. The Committee have minuted their warm appreciation of Mr Greenshield's work for the Branch. He is succeeded by Mr William H. Rutherford, Secretary and Librarian of the Royal Society of Edinburgh, who is welcomed to his new office.

The Branch annual general meeting will be held on Friday 22nd February at the Scottish Central Library, Edinburgh, in conjunction with a one-day conference. The sessions will include a paper on the system of inter-library partnership at Sheffield. Further details may be obtained from Mr Rutherford at the Royal Society of Edinburgh, 22 George Street, Edinburgh 2.

Aeronautical and Engineering Groups

The programme for the joint conference to be held at the College of Aeronautics on 5th–7th April 1963 is nearing completion. Papers will be given by Mr Melvin S. Day, Director of the Office of Scientific and Technical Information, National Aeronautics and Space Administration (USA), Mr E. G. C. Burt, Head of Space Department, Royal Aircraft Establishment, Bedford, Mr A. Chinneck, Assistant Secretary of the Aeronautical Research Council, Mr C. H. Gibbs-Smith, the aeronautical historian, Mr F. B. Roberts, Editor of *Engineering*, and Mr J. Mills of the Aslib Cranfield Research Project. The Annual General Meeting of the Aeronautical Group will be held during the conference.

Electronics Group

A visit to the Patent Office Library has been arranged for Wednesday, 30th January 1963, at 5 for 5.15 p.m. There will be an introductory talk. The numbers are restricted to twenty-four and Group members wishing to attend should get in touch immediately with Mr R. S. Lawrie, Chief Librarian, Sperry Gyroscope Co., Bracknell, Berks.

Conference on Co-ordinate Indexing Systems

Aslib is to hold a Conference on Co-ordinate Indexing Systems at the Connaught Rooms, London WC2 on Thursday 14th March. Mr Raymond A. Wall of A. V. Roe & Company Limited will take the chair at the morning sessions. Mr Leo Jolley of J. L. Jolley & Partners will discuss the mechanics of concept co-ordination, dealing with the principles involved in manipulating information with item entry and feature entry equipment—including Uniterm cards, punched feature cards, sequentially sorted item cards, and systems of simultaneous selection, demonstrating the different approaches that can be applied for different purposes; he will relate the uses of information indexing to the wider field of data handling, and will also touch upon the use of 'extended fields'. Mr B. C. Vickery of the National Lending Library will speak on vocabularies for co-ordinate indexing systems and explain how indexing documents is labelling them with words; how the words can affect the efficiency of the systems; how vocabularies can be unrestricted or controlled; and he will talk about aids to broaden the search—classifications and thesauri—and aids to narrow it—associations, links, roles, categories, and weighting.

In the afternoon Mr J. R. Sharp of British Nylon Spinners Limited will be in the chair and the following four speakers will give accounts of practical applications of 'feature card' systems: Mr G. M. Boyd, O.B.E., Technical Records Officer, Lloyds Register of Shipping; Mr S. B. Childs, Librarian, Guided Weapons Technical Information Bureau, Bristol Aircraft Limited; Mr A. Johnson, Librarian, British Insulated Callender's Cables Limited; and Mr D. G. Shedden, Technical Assistant to Chief Mechanical Test Engineer, Dowty Rotol Limited. Each speaker will briefly describe the system used in his library and the meeting will be thrown open for general discussion on all aspects of the subjects covered during the day.

Programmes and application forms for the Conference are being circulated with this issue of *Aslib Proceedings*. Applications to attend should reach Aslib not later than Thursday 28th February 1963.

Documentation in the Social Sciences

The International Committee for Social Sciences Documentation, which is concerned with the development of the social sciences and the improvement of bibliographic and other tools used in this field, hopes to see established in every country where this is possible a national committee for documentation in the social sciences.

These national committees will no doubt differ according to national conditions and interest, but it would seem desirable that they should include both users and producers of documentation so that the experience on the one hand of the bibliographers and documentalists and on the other hand of subject specialists, such as research workers and professors, could be effectively shared.

Among the tasks of these national committees might be:

1. To ensure on a national scale the exchange and distribution of information relevant to all fields of endeavour within the social sciences.
2. As far as possible to co-ordinate bibliographical and documentary work

in the social sciences within the country, and, in particular, to foresee and prevent any undesirable overlapping.

3. To act as a link with the international committee, sending to it all relevant national information and transmitting back information about activities carried out on the international scale.

Consideration is being given to forming an Aslib Social Sciences Group for these purposes. Members interested in the proposal are invited to notify the Director before the end of February.

Economics Group Conference

The Aslib Economics Group's first conference was held at 3 Belgrave Square on Tuesday 20th November 1962 and was attended by seventy-seven delegates.

The conference was sponsored by the Group's Committee as part of its aims to extend the means of contact between commercial librarians and information officers, and to provide an opportunity for meeting and discussing mutual problems. The conference was extremely well supported by Group members and very valuable experience was felt to have been gained.

A broad theme—economic information—was deliberately chosen, and special aspects of the theme were discussed by panels of Group representatives. At the first session Mrs Patricia Millard took the chair, and Mr Leslie Smyth, Commercial Librarian of Manchester Public Libraries, spoke on the resources of public libraries, Mr K. G. B. Bakewell, Librarian of the British Institute of Management, described the recent BIM survey of information departments in industry and commerce, and Mr Peter Lewis, Senior Assistant Librarian of the Board of Trade, dealt with the evaluation and use of overseas statistical sources.

The second session covered aspects of storage and filing. Dr A. J. Walford, Joint Intelligence Bureau, Ministry of Defence, was in the chair. Miss D. M. Hamerton, Librarian of the Royal Institute of International Affairs, spoke of some of the special problems of Chatham House and how they had been solved. In the absence of Mr Kuhnberg, Librarian of the *Financial Times*, Dr Walford read a paper by him, describing the filing procedures of a major newspaper library and the pressures leading to the adoption of new techniques.

The question of training courses for junior information officers, particularly in the use of economic statistics and company accounts, to supplement on-the-job training was raised by Mr John Alder, Manager, Intelligence Section, Economics and Statistics Department, Unilever Limited, who introduced the session devoted to staff.

Mr Frank Mutton, Manager, Information Department, Thames Board Mills Ltd, spoke about the manifold duties carried out by the staff of a small information department, laying particular emphasis on the selection of people with the right personality and the need for knowledge of the business they serve. Mr Jack Bird, Education Officer, Aslib, contributed some thoughts on the attributes of the ideal information staff and offered the suggestion that opportunities to learn information work in the economics field could be greatly improved.

In the fourth session, with Mr Robert Petchey, Head of the Statistical Department, Swiss Bank Corporation, in the chair, three speakers gave their views on the service that economic information units should aim to provide. Miss D.H. Grose, Head of the Information Department, Consumers' Association, stressed the need for direct and personal service by high quality staff who know not only their sources of information but also the people they serve. Mr Philip Colehan, Deputy Director of Tottenham Public Libraries, divided the public library's information services into active and passive roles, the former being the encouragement of the public to use material, and the latter the provision of repository and browsing facilities. Mrs M. Cronan, of the Information Department, Marketing Division, Thomson Allied Newspapers Ltd, spoke of the problems inherent in providing a ready-made information service to a clientele with widely diverse interests. Mrs E. E. Stowell, Chairman of the Group, conducted the final session, in which members had the opportunity of describing their own particular 'hobby-horses'.

Bookshop Fire

During a bad fire at the bookshop of Mr H. Pordes (in the first week of December), all the order forms for R. A. Peddie's *Subject index of books published up to and including 1880* and for F. W. Brooks's *English naval forces 1199-1272* were destroyed. Mr Pordes asks that all librarians and others who have placed orders for these publications should send him copies of their orders, addressed to H. Pordes, Publisher and Bookseller, 138 New Cavendish Street, London W1.

Information Course: Change of Date

The 'appreciation course' on methods of handling information, arranged for March by Messrs J. L. Jolley and Partners, will now take place on Wednesday and Thursday, 6th and 7th March, *not* 13th and 14th March as announced in the November 1962 issue of *Aslib Proceedings*. The course will still be held at The Bell, Aston Clinton, Bucks, and the other details are unchanged. Inquiries about this and other courses in the series should be made to J. L. Jolley & Partners Limited, 46-8 Frogmoor, High Wycombe, Bucks.

Course on the Use of the Chemical Literature

A short course will be run by the Liverpool College of Technology in conjunction with Liverpool Public Libraries and LADSIRLAC (Liverpool and District Scientific, Industrial and Research Library Advisory Council) from Wednesday 20th February to Friday 22nd February 1963. The course will include both directed library work and lectures given by librarians and chemists. It is designed to show newly qualified chemists in research and industry the kinds of information contained in the chemical literature, and how to retrieve it. Further information may be obtained from Dr C. B. Clarke, Department of Chemistry and Biology, College of Technology, Byrom Street, Liverpool 3, who will also assist those requiring hotel accommodation during the course.

Nottingham and Nottinghamshire Technical Information Service

A new co-operative information scheme has been established, based on the Commercial and Technical Department of the Nottingham City Libraries. Known as the Nottingham and Nottinghamshire Technical Information Service (NANTIS), the scheme will set out to embrace all of the libraries, research associations, trade associations, and industrial and business firms in the City of Nottingham and County of Nottinghamshire. Membership will also be open to similar organizations in the areas surrounding the County who wish to apply for membership, but these organizations will join as Associate Members. It is hoped to attract members from many of the smaller commercial and industrial firms in the area. There are no conditions of membership except that members should be interested in or concerned with the improvement of information services.

A membership fee of £3 for Members and £5 for Associate Members will be used for the administrative costs of the scheme and will also be available to finance a regular News Bulletin and other publications, including a Directory of Resources.

The Council of NANTIS will meet annually, and the activities of the scheme will be carried out by a Technical Committee of fifteen members. Over forty organizations were represented at the first meeting of Council held in December, and the scheme formally came into operation on 1st January 1963.

Language Symposium

The symposium on 'Language matters' held by the Institute of Linguists and Britain in Europe on 21st November 1962 is to be published in the *Incorporated Linguist* for January 1963. Some of the papers were announced in *Aslib Proceedings* for November 1962, and details can be obtained from the Institute of Linguists, 3 Craven Hill, London W2 (telephone Paddington 6462/3).

Library Telex Directory

The new edition of the Library Association's *Library telex directory*, published in December, lists four hundred libraries with access to telex (three times the number of entries in the 1960 edition). There are annotations indicating those libraries that cannot accept loan requests or inquiries by telex.

A helpful foreword reminds users that, since telex is usually cheaper than alternative channels of inquiry and provides an accurate record for each subscriber, it is useful not only for urgent requests but for others. The directory should lead to an increased use of telex among libraries.

It is available from the Library Association, Chaucer House, Malet Place, London WC1, price 8s (6s to members of the LA).

The New New Technical Books

New Technical Books, published by the New York Public Library since 1915, will appear in a new format beginning January 1963, and will come out ten times a year. This selective list with its descriptive annotations will thus be able to give its readers more rapid information about many more new scientific

and technical books as they are published, and in a more convenient and effective presentation. Entries will now be arranged by broad Dewey decimal classes and will be numbered consecutively straight through the year; author and subject indexes will be included for each issue.

Emphasis, as in the past, will be on noteworthy American imprints, and contents and annotations will continue to be provided. Noteworthy foreign works will be included occasionally, printed in smaller type.

The new subscription price for *New Technical Books* will be \$3 per year. The new rate will take effect upon renewal of present one-year subscriptions. All orders under \$5 should be prepaid and subscriptions and subscription inquiries should be addressed to the Public Relations Office, The New York Public Library, New York 18, New York, USA.

Penal Reform Library Catalogue

The catalogue of the library of the Howard League for Penal Reform is to be published in the spring of 1963. It will have nearly 3,000 entries, with author and subject indexes, and will represent a wide selection of important twentieth-century reading on criminology and penology. The price will be between 5s and 6s a copy, according to demand. Requests for copies should be addressed to Library Catalogue, Howard League for Penal Reform, Parliament Mansions, Abbey Orchard Street, London SW1.

New Year Honours

Members will be delighted to know that Dr W. Beattie, Librarian of the National Libraries of Scotland, has been awarded the C.B.E. in the New Year Honours List. Heartly congratulations are offered to Dr Beattie and also to Miss H. M. Dinsmore, Librarian of the Houses of Parliament, Northern Ireland, who has received the M.B.E. Another award of special interest to members is that of O.B.E. to Dr H. G. Hopkins, Senior Principal Scientific Officer at the Radio Research Station, Department of Scientific and Industrial Research, and congratulations are offered to him.

Senior Introductory Course to Information Work

In order to meet the needs of those students who were unable to obtain places on the Senior Introductory Course to Information Work held on 14th-18th January, the course is to be repeated from 4th to 8th March. The programme will be exactly the same as that for the earlier course (sent out with the November 1962 issue of *Aslib Proceedings*). Those who applied for the original course have been informed. Any other students wishing to attend should write to the Education Officer, Aslib, enclosing the fee of £10.

Japanese Serials in the Library of Congress

The Library of Congress has just published *Japanese scientific and technical serial publications in the collections of the Library of Congress*. This lists, in two sections, current and non-current periodicals in western languages from the

general collections, and in Japanese from the Orientalia division. The Japanese journals are listed under titles transliterated by the Hepburn system.

Each list is arranged alphabetically within broad subject divisions and the separate indexes provided make adequate cross-references from the names of issuing bodies.

For each entry the title, publisher, frequency, date of commencement, and Library of Congress holdings are given. Japanese language titles are given in the transliterated form, followed by the Japanese characters and the English version.

Both as a check-list for verifying titles and as a location list through which British librarians will be able to obtain photocopies, this publication is well worth obtaining. It is available from the Superintendent of Documents, Government Printing Office, Washington 25, DC, price \$1.50.

THE SFB SYSTEM AND THE INFORMATION PROBLEMS OF THE BUILDING INDUSTRY

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Midlands Branch meeting, Birmingham, 1st October 1962

THE BUILDING INDUSTRY

I INTEND in this paper to describe the methods we are evolving to deal with information problems in the building industry. But first I must say something of the industry itself. Not only is it a very large industry but it is fragmented in organization. The most common process involved in building is that the client who pays for the building initiates it by calling upon an architect to investigate his building needs in detail and to prepare designs. The architect is invariably advised by an independent quantity surveyor about likely costs, who, after approval of the designs, prepares specifications and bills of quantities. These documents, together with detailed working drawings, are used to invite tenders from general contractors. The successful general contractor enters into a contract with the client and then constructs the building. Construction is a process involving the identification and transport of large numbers and quantities of building products and their co-ordinated assembly on site, following the instructions in the contract documents which are in the form of drawings, specifications, and bills of quantities. The building products, such as cement and blocks, and equipment such as boilers are ordered by the general contractor from manufacturers, merchants or specialist contractors to the specification of the architect. The architect is aided in design and specification by specialist technologists and consulting engineers.

It can be seen, therefore, that building involves *individuals*—architects, quantity surveyors, builders, specialist technologists, and engineers—and *firms*—professionals, manufacturers and merchants, and contractors. Since the firms will be independent, related only by contract, and the individuals may all be trained in different ways and different schools, acute problems of communication will arise. Building is slowly changing from a craft activity to an industrial process and the increasing need for innovation aggravates problems of communication still further.¹

In all this the role of the architect is crucial, and much depends on his knowledge and the decisions he takes in the early stages of the whole programme, which for a building worth £250,000 to £750,000 may take three and a half years.

The architectural profession in this country is a profession of general practitioners and the architect, like the medical general practitioner, is expected to cover a wide range of subjects. It follows that many of his information problems

arise from the broad scope of his subject field. Other individuals and the firms in the industry are concerned with only parts of this field, in greater depth. However, unlike the medical general practitioner, the architect cannot draw on a wide range of specialist experts. In consequence he needs well organized information, available both within his office and from varying outside sources.

INFORMATION NEEDS OF THE INDUSTRY

From this brief description of the building process it can be seen that information is needed for both strategic and tactical matters. A large part of everyone's time is taken up with practical matters involving drawing, writing specifications and bills, costing, ordering, and giving operational instructions. Much of the information needed is used just as a tool. The information must therefore be usable and ready to use.² For information to be usable it must not only be understandable but must be organized in a way which is related to the user's work. For information to be ready to use it must be accessible in the office or quickly supplied from outside.

Most of the work done on the information problems of the industry has been concerned with these two aspects. The need for usable information has led to a study of the nature of information, its content organization and presentation. The need for accessible and ready-to-use information has led to a study of accessibility, information retrieval, classification, indexing, office reference libraries, and standardization of format.² These studies make apparent the extreme decentralization of the production of information on any one subject. This decentralization has made the co-ordination of information ready to use in the office hard to achieve for the building practitioner. The scattered organizations or individuals responsible for the source material have to be persuaded to improve the usefulness of the information itself.

DECENTRALIZED PRODUCTION OF INFORMATION

Information for the industry comes mainly from the following sources:

1. Research and development organizations including ministries and the Department of Scientific and Industrial Research (publishing through Her Majesty's Stationery Office), and trade research and development associations (publishing individually).
2. Institutions (proceedings, transactions, and reports).
3. Publishers (books from individual authors).
4. Technical and trade press (periodicals).
5. Building product manufacturers and merchants (catalogues of products).
6. British Standards Institution (standards and codes of practice).

These six main categories are active in publishing large quantities of information, and the situation is unlikely to change since the quantity of information is steadily increasing, and the quality improving. Information on any one subject is likely to come from all six categories, for all of them range over practically the whole of the field.

For the busy practitioner immersed in his daily problems this produces a nearly insoluble problem in co-ordination. The present flood of unco-ordinated

information from a variety of sources is rather like tearing an encyclopaedia to pieces and publishing it in hundreds of different places and in different ways with the headings missed out, each user being left to piece the book together without help.

After considering the importance of having information ready to use, the users' representative institutes—the Royal Institute of British Architects, the Royal Institution of Chartered Surveyors, and the National Federation of Building Trades Employers—issued their recommendations in October and November 1961 covering the following:

- format of publications;
- classification;
- content of trade literature;³

in an attempt to simplify the problem by standardization.

INFORMATION STANDARDS

The standards recommended so far are:

Size. One size only to be used and this to be A4 (210 × 297 mm.) from the International Standard Paper Sizes. Details are contained in British Standards 3176⁴ and International Organization for Standardization (ISO) Recommendation R216,⁵ and also in *Facts about international A sizes*⁶ and John Tomkins' *DIN—a new, old cause*.⁷

Classification. All information intended to be retained for reference is to be pre-classified so that it can be readily filed in the office and made more accessible when required. The system of classification recommended is described in the *SfB/UDC building filing manual* published by the Royal Institute of British Architects. This demonstrates the SfB Classification and gives a concordance with UDC.⁸

Content of trade literature. The recommendations of the three users' institutes are published by the Building Centre under the title *Guide to the preparation of trade literature for the building industry*.³ They deal with layout, binding, illustrations, typeface and give a schedule of the information required on products and services.

The progress made in the adoption of these standards in just twelve months from the issuing of the recommendations is encouraging. Although the increasing adoption of International Standard Paper Sizes is not only due to the activities of the building industry, it has been strongly influenced by the firmness of that industry. The British Standards Institution initiated the change-over in 1958, and all its new publications conform in size to ISO R216.

All Government departments have changed to this system for stationery and Her Majesty's Stationery Office is slowly adopting it for publications. Four out of the six main periodicals have adopted A4 and the SfB classification. As several of these periodicals are now latex-bound and articles start on the right-hand page, the completely fileable periodical has definitely arrived. Most of the numerous trade research and development associations have accepted the recommendations and are in course of changing. Manufacturers produce

roughly half of the total material normally kept for reference and these recommendations are very important to them. The number of manufacturers concerned is very large and the problem of reaching them correspondingly difficult. A slow but steady change-over is under way, spurred on by an annual competition for trade literature—conforming to the *Guide*—organized by the Building Centre.

THE SfB SYSTEM

The system of classification recommended by the users' institutes and now being increasingly adopted in the building industry as part of a general move towards standardization may be of interest to others outside the industry.

It originated in Sweden and the letters SfB are the initials of the committee which originated it. It was examined by a specialist team of the International Building Classification Committee (IBCC), a joint committee of the International Federation of Documentation (FID), and the International Council for Building Research, Studies and Documentation (CIB). They carried out a comparative study of fifty-five special systems and reported to First Congress of CIB in September 1959. The reports of this study are available from the CIB General Secretariat and from the Danish Centre for Documentation.⁹

The system was adopted for international use by CIB at Rotterdam in 1959 and is now controlled by a sub-committee of IBCC on behalf of CIB, with liaison with FID for the purpose of studying the concordance with the Universal Decimal Classification. A very full bibliography on building documentation 1938-62 has been prepared by R. Mølgaard-Hansen, who was the Secretary of the International Building Classification Committee for ten years.¹⁰

THE USE OF INFORMATION IN THE OFFICE

The second concern of studies of information in the building industry has been accessibility.

The architectural profession has been subjected to an unusual amount of scrutiny recently. The RIBA initiated a detailed and searching study into organization, staffing, quality of service, and productivity, and this was recently published by the RIBA as the *Architect and his office*.¹¹ This report was referred to by Sir Robert Shone as a 'model of a report' and he said that 'not many professions or bodies had people who could write such a report'. The conclusions of this report emphasized the need for changes in education, management, and technical resources, if the increased productivity likely to be demanded of the building industry in the next ten years was to be attained.

In all this, much depends on the right information being accessible to the architect. Since the publication of guidance on information standards an increasing number of architects' and builders' offices have been setting up office reference libraries, using the SfB System.

To help newcomers to this work I published a series of five articles in the *Architects' Journal* called 'The office reference library', based on the experience of offices with libraries and with practice in methods of filing and retrieval.¹² The first article deals with function and with cost covering the work to be done,

allocation of staff, salary scales to help office principals; the second article deals with equipment and accessories in considerable detail. The use of equipment is explained, and sources of supply, and prices, are given. The third article is a manual of procedure for the guidance of those in charge of office reference libraries. The fifth article is a bibliography of general reference material.

THE CONTENT OF OFFICE LIBRARIES

Those responsible for office libraries need all the help they can get when building up the library, and to help with this the Royal Institute of British Architects has published a Technical Reference Section list of technical reference material recommended for all offices;¹³ a further more extended list for students has also been published.¹⁴

Numerous other aids to finding and using information are needed but no means of producing them has yet been found. However, one important new development must be mentioned. To help architects to find and use information, the *Architects' Journal* has been producing over the last twelve months a series of Design Guides which list design procedures in check list form and give selected technical references to publications. As a key to sources of information it is probably unrivalled, at least in the building industry. The Sfb System is used for the classification of these Design Guides.

It has not been found possible to develop an abstracts service which commends itself to users.

THE NEXT STEP

It cannot be said that the supply of information to the building industry is satisfactory. What has been done has only cleared the decks and alerted the users. Many problems remain. Further development will probably include:

1. A network of information centres with technical reference libraries.
2. The launching of several new series of publications based on the standard classification and format, from universities, new institutes, technical centres, and government bodies.
3. The extension of studies in depth of the nature of the information required by the building industry, and the publication of guides to more useful publications.
4. The growing realization on the part of producers of information that if they wish to communicate they must study the means of communication.

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How to Use the Manual

Principal Divisions of the Sfb/UDC Main Tables

A	Theory	The background to the investigation, planning and design of buildings. <i>Sources of Information, Social Sciences, Law, Natural Sciences, etc</i> <i>Technology, Hygiene, Engineering, Insulation, etc</i> <i>Planning, Landscape, Architecture, Design, etc</i>
B	Practice	The background to the effective and economic use of resources. <i>Management, Organization, Investigation, Regulation, Communication, etc</i> <i>Building Practice, Site Administration, Tools and Machines, etc</i> <i>Maintenance, Cleaning, Restoration, Demolition, etc</i>
C	Earthwork	The investigation and preparation of the site for building. <i>Site Investigation, Soil Mechanics, etc</i> <i>Excavation, Cutting and Levelling, etc</i>
D	Materials	The substances and formless products from which building components and elements are made. <i>Properties, Testing, Manufacturing Methods, etc</i> <i>Substances, Metal, Stone, Wood, Plastic, etc</i> <i>Formless Products, Aggregates, Limes, Cements, Mortars, Bitumens, Adhesives, etc</i>
E-X	Construction	The methods of construction and works, and the general products and operations which characterize these methods. <i>Operations, Concreting, Brickwork, Erection, Assembly, Pipe-work, etc</i> <i>Products, Reinforcement, Bricks, Structural Units, Sections, Pipes, etc</i>
(1)-(8)	Functional Elements	The parts of a building and its setting, which are distinguished from each other by difference in function, and the particular products which are specially used in an element. <i>External Elements, Structures, Services, Installations, Finishes, Fixtures, etc</i> <i>Element Products, Windows, Doors, Boilers, Refrigerators, etc</i>
(9)	Buildings	The types of buildings according to the nature of the human activities which they house or provide for. <i>Engineering Works, Public, Industrial, Health, Educational Buildings, etc</i>

FIGURE 1. *The Sfb/UDC building filing manual*

The principal divisions of the Sfb/UDC main tables show briefly the scope of the system. A detailed reference is composed by combining Walls (21) with Bricks F of clay g2 giving (21) Fg2.

SfB/UDC Main Tables

(93)-(98)

Building Types

(93)	725.48	Craft industry and consumer service works	<i>Laundries, forges, gunsmiths, upholstery, cobblers, book-binders, tailors</i>
(94)	725.5	Health and Welfare Buildings : General	
(94)	725.511	General hospitals	
(94)	725.512	Clinics, dispensaries, surgeries	<i>Treatment centres, pharmacies, health centres</i>
(94)	725.512.3	Practitioners' surgeries	
(94)	725.513	Nursing homes	
(94)	725.514	Convalescent homes	
(94)	725.515	Sanatoria	<i>For incurables, infectious diseases</i>
(94)	725.52	Mental hospitals	
(94)	725.54	Homes for the physically handicapped	<i>For the blind, deaf-dumb</i>
(94)	725.56	Homes for the aged	
(94)	725.57	Child welfare buildings	<i>Homes, crèches, day nurseries</i>
(94)	725.59	Other hospices and institutions	<i>Hydropathic, veterinary establishments</i>
(94)	725.6	Prisons, reformatories	
(95)	725.7/.8	Refreshment, Entertainment and Recreation Buildings : General	
(95)	725.71	Restaurants, cafés	<i>Snack-, milk-, coffee-bars, cafeterias, dining halls, refectories, canteens</i>
(95)	725.72	Public houses, bars	
(95)	725.73	Baths, thermal and medicinal baths	<i>Pithead baths</i>
(95)	725.74	Swimming baths, covered and open-air	<i>Bathing huts, diving platforms and structures</i>
(95)	725.75	Holiday buildings	<i>Casinos, kursaals</i>
(95)	725.76	Park and garden buildings	<i>Bandstands, conservatories, winter gardens</i>
(95)	725.8	Entertainment and recreation buildings : General	
(95)	725.81	Concert halls	<i>Halls, salons, audition, music practice rooms</i>
(95)	725.82	Theatres	
(95)	725.821	Opera houses	
(95)	725.823	Dance halls	
(95)	725.824	Cinemas	
(95)	725.826	Amphitheatres, stadia	
(95)	725.83	Assembly buildings	<i>Congress halls</i>
(95)	725.835	Village halls, community centres	
(95)	725.84	Sports buildings : General	<i>Sports centres and groups of buildings</i>
(95)	725.85	Buildings for indoor games	<i>Billiard saloons, skittle alleys</i>
(95)	725.85	Gymnasia, covered courts	<i>Tennis, badminton, fives, squash courts</i>
(95)	725.86	Rinks and racing tracks	
(95)	725.87	Buildings for yachting and boating	<i>Boat houses</i>
(95)	725.88	Riding schools	
(95)	725.89	Other recreation buildings	<i>Shooting ranges, race-courses, grandstands, sports pavilions</i>
(95)	725.9	Various civil buildings : General	
(95)	725.91	Exhibition buildings, fairs	<i>Comprehensive layouts, buildings, and stands</i>
(95)	725.94	Monuments and other freestanding features	<i>Arches, shelters, clock and bell towers, fountains</i>
(95)	725.96	City and town gateways and walls	<i>Gateways, barbicans, ramparts</i>
(95)	725.98	Large underground halls or spaces	
(96)	726	Ecclesiastical Buildings : General	
(96)	726.1	Temples	
(96)	726.2	Mosques	
(96)	726.3	Synagogues	
(96)	726.5	Churches, chapels, church halls	
(96)	726.6	Cathedrals	
(96)	726.7	Monasteries, abbeys, priories, convents	
(96)	726.8	Funerary architecture	<i>Memorials, tombs, mausoleums, crematoria</i>
(96)	726.9	Other religious buildings	<i>Parsonages, episcopal palaces, litle barns</i>
(97)	727	Educational, Scientific and Cultural Buildings : General	
(97)	727.1	Primary schools	<i>Infant, junior, elementary</i>
(97)	727.2	Secondary schools	<i>High schools, comprehensive schools, boarding schools</i>
(97)	727.3	Universities, colleges	<i>Departmental buildings, and non-teaching buildings such as unions, administration [for halls of residence see (98)]</i>
(97)	727.4	Technical, vocational, professional training colleges	<i>Art, technical, commercial colleges, academies, conservatories</i>
(97)	727.5	Scientific and professional societies	
(97)	727.56	Laboratories	<i>School, university, research station</i>
(97)	727.6	Zoological and botanical garden buildings	<i>Animal houses, temperate and tropical houses, aquaria, herbaria</i>
(97)	727.7	Museums and art galleries	<i>Science, natural history museums, sculpture and picture galleries</i>
(97)	727.8	Libraries	<i>Public school, college, university libraries</i>
(97)	727.9	Other scientific buildings	<i>Observatories, planetaria, seismometric and meteorological stations</i>
(97)	727.94	Broadcasting stations, studios	
(97)	727.97	Artists' studios	
(97)	727.98	Film studios	
(98)	728	Residential Buildings, Houses and Housing : General	
(98)	728.1	Housing : General	
(98)	728.2	Flats : General	<i>Maisonnettes</i>

FIGURE 2. *The SfB/UDC building filing manual, a page of divisions*

The SfB/UDC concordance is shown together with annotations on systematic headings.

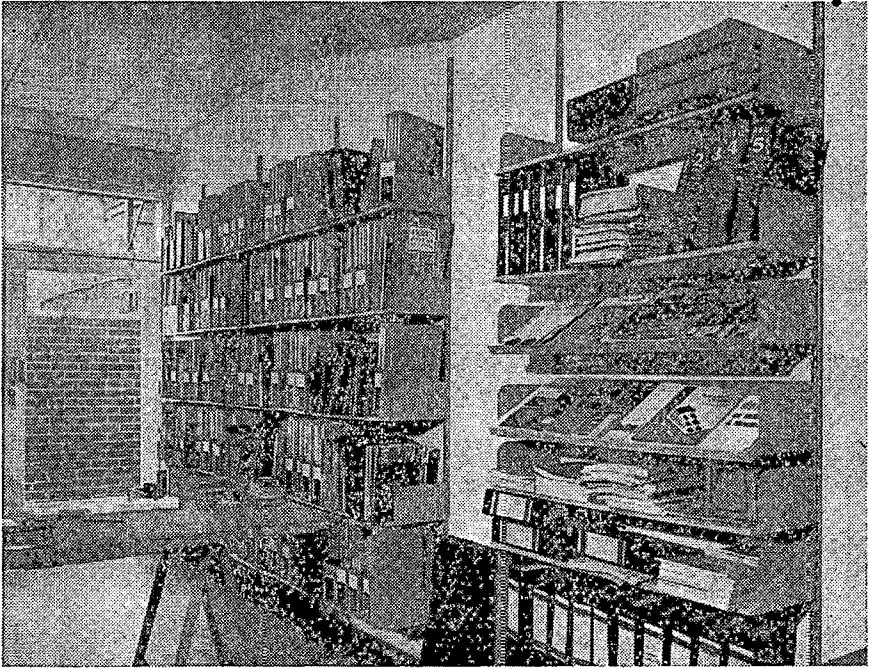


FIGURE 3. *An office reference library*

Library run by full-time architect-librarian with an assistant. Ensfile boxes with Jetley's files on 45 ft. run of shelves (left). Pamphlets and papers are pinned into files. Periodicals and general reference works on 21 ft. run of shelves (right). Each book or file has Sfb classification and title typed on strips and attached with self-adhesive tape. This is an integrated system, books are interspersed with files in one sequence of subjects, and it is recommended as the best and most economical arrangement for an office of fifteen or more architects.

SOME IMPLICATIONS OF THE NEW LIBRARY ASSOCIATION EXAMINATION SYLLABUS FROM THE SPECIAL LIBRARY VIEWPOINT

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MISS L. V. PAULIN, M.A., F.L.A., County Librarian of Hertfordshire and Chairman of the Library Association Education Committee, opened the meeting and introduced Mr Patrick, who as a special librarian and one closely concerned with the drawing up of the new Library Association Examination syllabus was, she felt, a fortunate choice of speaker. About one hundred members of Aslib attended the meeting.

I. INTRODUCTION

The purpose of this paper is to give consideration to the implications of the Library Association's 1964 examination syllabus from the special library viewpoint. It is not necessary to define the syllabus since it has been available for study since July 1960¹ and in revised form since May 1961.² It is, however, of interest to note that the syllabus has resemblance to the draft syllabus published in March 1957³ and produced as a result of work by a Joint Committee composed of representatives of both Aslib and the Library Association. This draft served as the basis of the work done by the Library Association Syllabus Subcommittee which was also appointed in March 1957. Four Study Groups, composed of teachers and examiners, have been giving consideration to the syllabus in great detail and these considerations are leading to some modifications which at present are unpublished. These modifications will, however, not affect the major implications of the syllabus, which arise from its general nature rather than its detailed requirements. It is hoped that in joint discussion we may see more clearly into the future and come to understand more fully how the new proposals of the Library Association are likely to affect those libraries which together make up such a substantial proportion of Aslib's membership.

2. PRE-ENTRY QUALIFICATIONS

- Pre-entry qualifications to the Intermediate Examination are, in brief, five passes in the General Certificate of Education (GCE), of which one is English Language and two are at Advanced level.⁴ To guard against an immediate fall in recruitment as a result of requiring two passes at 'A' level, an Entrance Examination in library subjects at approximately 'A' level will be held for those whose GCE is not of the required standard. Candidates for the Entrance Examination, which will be similar to the present First Professional Examination,

tion, will be required to have at least five passes in the GCE at Ordinary level. The Entrance Examination, which is perhaps rather strangely equated with 'A' level passes in the GCE, is intended as a temporary measure. Graduates will be exempt from the Intermediate Examination.

What then are the implications of these pre-entry qualifications from the special library viewpoint? One can draw attention to the following points:

a. 'A' Level entry and Entrance Examination

The provisions are intended to ensure that the professionally qualified librarians of the future are likely to have the advantage of at least a sixth-form education. This in itself is clearly a self-evident gain which needs no justification here. Of necessity, however, there is no indication how long the Entrance Examination is likely to be available. It is described as a temporary measure but while it is available it will provide a means of entry to the profession without any 'A' level passes. The intended aim, however, is in the opposite direction and carried to its logical conclusion could have made librarianship a graduate profession. This possibility is on record as having been considered but 'it was thought advisable, for the time being at least, to continue to allow non-graduate entrance to the library profession in the United Kingdom. It would be wrong to raise pre-entry requirements to a point where recruitment was demonstrably insufficient to meet current, let alone foreseeable, demands'.¹ This is believed to be a correct conclusion but for the proposals to succeed from the special library viewpoint we need to attract an adequate supply of suitable candidates with 'A' level passes in the GCE, particularly in science subjects. Can we be sure of this supply?

b. Graduate entry

It is clearly desirable that more university graduates be attracted into the profession than at present; from the viewpoint of special libraries an appropriate proportion of these should be science graduates. The exemption from certain basic studies, in a course which needs to be regarded as an integrated whole, does graduates no very useful service. W.B. Paton in his recent Presidential Address⁵ to the Library Association said:

- . . . the whole Association must think again on the position of graduates under the new syllabus. It is unrealistic to expect them, after a period of three or four years' study at a university, to undertake the additional two years' course laid down for non-graduate entrants. Recognizing this, the Education Committee worked out a special syllabus suitable for a course of one year, but it proved unacceptable to the Council, which substituted the ill-considered alternative of exempting graduates from the first year's basic core subjects, and requiring them to complete after one year's study the advanced Final examination which, by its very nature, calls for both the preparation of the groundwork basic course and the discipline of practical work in a library—neither of which the graduate has experienced. A misguided set-up indeed, which is unlikely to attract graduates to the career of librarianship. It must be remedied without delay.

The Library Association does need to look at the proposals regarding graduates again; there is certainly support from among the heads of schools of librarianship for this view. It is difficult to comment on this matter at present because

there would appear to be unsettlement in the Library Association and the rejected proposals of its Education Committee are not known. The matter is, however, of such importance that there is clearly urgent necessity to find some way to attract graduates into the library profession by more suitable means than is proposed at present. It is, of course, to be hoped that the Sheffield University School of Librarianship will be attractive to science graduates. The salary aspect is, also, of significance since one cannot help thinking that science graduates have in the past been repelled from librarianship because they have judged that to add librarianship to their basic qualifications would not enhance their opportunities for promotion and advancement in salary; librarianship is certainly no conventional avenue to top management in industry. This matter of salary will, however, be dealt with again since it clearly relates to both graduates and non-graduates.

3. SELECTION OF TRAINEES*

The new proposals imply that recruits to the profession will normally be deciding on librarianship studies in sixth forms or universities. Those who can correctly guide and help a young person into a suitable career are privileged. It is, however, undesirable that young people should become involved in full-time training, at public expense, for a career for which they are not suited. The question arises as to how all those concerned, including the trainee, may judge suitability for the work and how during the training course certain students may be directed towards studies related to work in special libraries. Those with GCE 'A' level passes or degrees in science and, possibly, languages would be likely candidates for special library studies. During the courses of study, aptitudes and personal qualities revealed and reports on courses of practical work, if such be obtained, can be taken into account. But what qualities should the schools look for in attempting to provide for the needs of special libraries? It is certain that success in special library work demands something more than the ability to pursue a course of study successfully. What then are the personal characteristics, aptitudes and kinds of intelligence that should be looked for in students selected for training in special librarianship? Are they different from those required in other kinds of libraries? There would seem to be need for an investigation the results of which could provide some guidance to the schools in their heavy responsibility of selecting candidates for special library studies. Assessing flair for special library work at the training stage, however, must involve opinion; more than one school of librarianship head would welcome guidance on this matter. One thing that can be done is to ensure that all potential trainees know as much as possible about the work. There would seem to be need for the widest publicity in all appropriate schools and the universities regarding opportunities in librarianship. Such publicity needs to be informative and in order that the special library aspects may be covered adequately there is a function here for Aslib to perform. The publicity

* B.I. Palmer urges a distinction in the use of the terms 'education' and 'training' which is not to be found in this paper. He says that recruits to the profession need education in librarianship and training in a library.¹⁸

needs to be on a large and continuous scale since we are competing with other professions for the ablest young people. We need to be sure that relevant information is provided by all publications related to careers, and all suitable organizations. The general aim should be that no potential entrant should lack information relating to special library work and its opportunities.

4. SYLLABUS

The details of the syllabus have been subjected to intense scrutiny by the Study Groups and their recommendations are believed to be at varying stages of acceptance. The Study Groups in addition to reviewing the syllabus have also been active in preparing annotations to it, and specimen examination papers. It is to be hoped that both will be published, since they will illustrate the interpretations to be put on the syllabus.

a. Intermediate Examination

This examination consists of four papers all to be taken at one sitting, although some provision for reference is made. The examination is to be of a standard between that of the present First Professional and Registration Examinations. The required standard will, therefore, be such that, with the advantage of full-time study, most candidates will pass at one attempt. Its suitability for part-time study remains a matter of opinion.

b. Final Examination

Ample choice is available in this examination. The papers may be taken together, separately or in any order. This examination may, therefore, be thought at first glance to be more suited to part-time study, provided teaching facilities are available and the student is willing to persevere through a lengthy period of preparation. However, the liberality of the syllabus may be restricted in practice through the need to combine the study of related subjects. Necessary visits could also be difficult for a part-time student.

c. Fellowship thesis

Very little published comment seems to have been made on this part of the syllabus.⁶ Nearly 120 proposals for theses have been received so far.¹¹ A number of these proposals, if completed, would undoubtedly produce theses of interest within the special library field. While there seems to be no shortage it is possible that the work of Aslib's Research Department may provide further relevant themes. The thesis requirement seems well suited to experienced special librarians.

d. Cataloguing and classification

Graduates who claim exemption from the Intermediate Examination and who choose not to take Final List B Papers 1, 2, and 3 can become professionally qualified librarians without ever having been examined in Cataloguing and Classification. One feels that at least Final List B Paper 3, Practical Classification and Cataloguing should have been made a compulsory paper for graduates and, possibly, others. However, a responsibility rests with the library schools to

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guide students towards appropriate combinations of the various alternative papers in the Final Examination. One feels, also, that the emphasis in the syllabus is largely on conventional book cataloguing and wonders whether sufficient emphasis will be given to those materials which are more important in special libraries, such as periodicals, reports, patents and specialized pamphlet material. With reference again to Final Paper B₃ the interesting suggestion has been made from one school of librarianship that lack of former library experience may lead more students than in the past to choose to be examined in classification schemes other than the Dewey Decimal Classification. This may be typical of many other possible implications hidden from us at present.

e. Languages and subject knowledge

For admission to the Register of Chartered Librarians it is necessary, among other requirements, to have GCE 'O' level standard in a language, other than English, or in a science. From this alternative requirement, and the relatively low level concerned, one could assume that languages and subject knowledge were of less importance in special libraries than in fact they are. The provisions, however, are justified in a basic professional qualification if the Library Association could be persuaded to make it clear that the qualification does not put all the tools that may be required for the job into the hands of the special librarian. One is aware that the thirty-four papers in List C of the Final Examination cover 'Bibliography and Librarianship in a Special Subject Field' but the papers do 'not seek to test subject knowledge as such'.² To overcome the present lack of stress on languages and subject knowledge the Library Association should emphasize their importance to trainees, particularly non-graduates, and urge them to follow appropriate courses of study during the first few years of full-time work. Widened linguistic ability and subject knowledge, in science, technology, the social sciences, for example, would increase a special librarian's usefulness and open doors of opportunity to those determined to excel. One of the advantages of full-time attendance at library school is that it would allow this further study to be undertaken while those concerned are relatively young. Early qualification, in all necessary ways, is particularly important in view of the tendency for marriage to come at an earlier age than a few years ago.

It is to be noted that the Library Association retains the phrase 'Register of Chartered Librarians' and makes no reference to Information Officers. This may be due to the fact that the Library Association believes that 'the profession of librarian and information officer is one'.¹⁶ Is it conceivable that an end to the, seemingly endless, special librarian-versus-information officer controversy could be brought into sight if the Library Association were also to award its Fellowship to those chartered librarians able to show some agreed ability in an appropriate subject field other than librarianship, and/or knowledge of languages? It may be noted that its bye-laws permit the Library Association to elect to Fellowship a member who, although not qualified as an Associate, is the author of an outstanding published contribution to librarianship or bibliography. Such elections are, however, limited to twenty.⁷ Should it be said that languages and subject knowledge are not integral to librarianship, one would affirm that, in fact, they are essential requirements for highest quality

work in fully developed special libraries. Is not this one reason why more graduates are needed in special libraries?

f. Library Assistant's Certificate

Consideration has been given recently to the use of professional and non-professional staffs in libraries.⁸ One implication of the present proposals is that the long-standing conventional practice of library assistants preparing, by part-time study, for fully professional appointments will become largely impractical. It is a fact, however, that many duties in special libraries of any size can be carried out perfectly adequately by those who have no intention of becoming professionally qualified and that such will continue to be employed. A proposal is under consideration within the Library Association that, quite separately from the professional syllabus, there should be a Library Assistant's Certificate for members of library staffs who carry out non-professional duties and who do not aspire to do otherwise.⁹ It is assumed that this would be similar to the present First Professional Examination; while, therefore, this examination is retained under the title 'Entrance Examination' there may be no need to set up anything else. It could, however, be of assistance to have the views of this meeting as to the desirability, or otherwise, of establishing such a certificate from the viewpoint of special libraries.

5. TRAINING

a. Library schools

There is a desire within the schools to do all that is possible to meet the needs of special libraries, as the following quotations from correspondence with the schools will show:

The schools of librarianship will be able to do far more for special libraries than they have done in the past.

To cater for special library needs we have made fairly generous provision. Two members of the staff of the school are former special librarians, and a third is a former librarian-in-charge of a commercial and technical department of a public library.

- This school will aim to provide, as a feature of its full-time courses, tuition in those specialized fields of the Final syllabus, for which there is even a quite small demand, e.g. 2-3 students.

We can cover everything in Lists A and B apart from B9 and B10 . . . A bigger problem, of course, arises with List C. Obviously we cannot hope to cover, even in the course of years, all the 34 subjects nor do I think we are going to find that all of them will be required by students. What I am, therefore, doing at the moment is to ask students to state, when they make application for enrolment, which subjects would be of interest to them. We can then see where the main choices lie and can then see which of these subjects are the likeliest for us to be able to offer.

It is our intention to expect every student to study an academic subject in addition to the subjects of the Intermediate Examination during the first year. This will be at the standard of the College first year Associateship and Degree courses. Those students who have little or no scientific background, but who express a keenness for work in a special library, will

be encouraged to take a scientific subject of this standard. This, we hope will prepare them for the Science papers in List C of the L.A. examination.

Even if there is no increase in the number of students enrolled annually, the actual population of the schools will be almost doubled by reason of the introduction of a two-year course, except for graduates, in place of the existing one-year course. There will clearly be need for more special librarians to take up teaching on a full- or part-time basis; it is essential that these be competent as teachers with a vocation for the work. The schools vary in geographical location; this point will have some influence on the facilities offered for practical experience. They may also develop characteristics of their own, some having particular strengths. These factors, and others, may have a bearing on the school to which a particular candidate may need to go; facilities for guidance on this matter will be necessary. Doubtless the newly formed Association of British Library Schools¹⁰ will give consideration to matters of general interest to the schools. Membership in this Association is open to library associations; it is, therefore, to be hoped that Aslib will become a member, and, through its membership, be able to give considerable assistance to the schools in connection with their work in training special librarians. Indeed, it may also be desirable for Aslib to have closer links with each of the individual library schools than perhaps it has at present. Some, at least, of the schools have advisory committees which include special librarians.

b. Leave of absence

One head of a school of librarianship writes:

It is a curious fact, that whereas special libraries have given a lead to the public libraries, in so many matters, on this particular issue the public libraries have gone ahead. Few assistants in public libraries have difficulty in obtaining leave of absence to attend a full-time school. I know that many special libraries are small and have small staffs, and that the release of staff for full-time courses creates big problems, but I am sure that in future, assistants will insist on such release.¹¹

This is clearly one of the implications for consideration. The problem arises from the limited numbers employed in so many special libraries. If leave of absence were to be granted it is certain that, in most cases, the vacancy would need to be filled; the problem then arises as to whether a suitable vacancy would be available at the end of the period of leave. In a number of cases the desire on the part of existing library staff to attend library school on a full-time basis can only be met by resignation. The difficulty is, of course, evaded when full-time study precedes employment.

c. Full-time and part-time study

Perhaps the most important aspect of the new proposals is the emphasis being placed on full-time study; it was, however, originally expected that part-time tuition would continue to be available.² A library school head has recently written:

Part-time study I feel must be regarded largely as a thing of the past. . . . We intend to stop part-time classes as soon as the transition from the old to the new syllabus is fully effected.¹¹

Another school in its current prospectus says:

We envisage offering part-time courses only for those for whom a full-time course is *quite out of the question* and then courses will be held mainly in the day-time. We expect that something of the order of six to seven years preparation at the rate of one whole day a week will be needed to prepare adequately for the ten papers of the new Intermediate and Final Examinations.

Other schools are similarly discouraging to the part-time student.¹¹ Further, it is announced that the Association of Assistant Librarians has decided not to offer correspondence courses for the new Intermediate and Final Examinations unless the need for them is proved. A course may, however, be offered for the Entrance Examination.¹² Part-time study will therefore be difficult and teaching facilities for it extremely restricted. Much concern has been expressed over the needs of those who wish to qualify by part-time study. One certainly hopes that the way will be left open for the determined suitable candidate who for some reason is unable to enter the profession by what will be the conventional channels of the future. If, however, those in special libraries feel the need for continued facilities for part-time tuition, powerful representation would be needed to overcome a very considerable weight of contrary opinion. It is understood that the Northern Branch of Aslib intends to circulate a questionnaire regarding part-time education in special librarianship and information work.¹⁷ It may be noted that during the last three years a steady average of about 60 per cent of those qualifying as Associates of the Library Association have attended schools of librarianship on a full-time basis.¹¹ The move to near complete full-time study is, therefore, not such a drastic change as may be thought. It has further been pointed out that 'the profession and the community at large can no longer afford to wait for years while part-time students plod painfully on taking one part of their examinations at a time—more qualified librarians are wanted too urgently for that'.¹¹

d. Practical experience

The intentions of the schools vary in this respect. The following quotations from letters or prospectuses received will demonstrate this:

For entrants who come straight from sixth form or university, an attempt will be made to give them some practical work, in public, university, and special libraries. For people coming from public libraries the aim will be to provide practice in special library work. Those from special libraries will gain experience in public libraries.

. . . there will be a period of practical work lasting for at least three months, probably midway between the two academic years, possibly at the outset.

It is hoped that *all* students will have at least 3-4 weeks in special libraries during the course, as well as practical work in other kinds of libraries.

We are contemplating a two-months period in a 'teaching library' before the start of the first year, and a similar period between the first and second years.

All students accepted for the School of Librarianship while at school or university, or whose practical experience of library work is limited, will begin their courses in September with an extra term of supervised practical work in designated libraries. This term will be an integral part of the course and is intended to test the student's choice of librarianship as a career and to give him a broad understanding of library work. After this term of practical work, students will begin their formal studies in the School in January. Other periods of practical work will be arranged during the course, particularly during the Summer vacations.

We are making contact with as many special libraries in the area as possible to see to what extent we may be able to co-operate with them in placing students into these libraries. I can foresee a number of difficulties here, more from the library's point of view than our own and although I realize that it is only a partial solution of the problem I am inclined at the moment to think that we shall give more help by giving students practical experience in the library here of the College of Advanced Technology. Naturally this will not give them any experience in special library methods but it will bring them more completely than anywhere else in this area in contact with some of the main bibliographical apparatus.

These procedures are at variance with the practice obtaining at the University of London School of Librarianship and Archives, where 'Candidates for admission to the librarianship courses are expected to have had a year's experience as a student assistant in a good library; the intensive nature of the academic course makes this preliminary introduction to library practice very necessary'.¹³ This experience is extended by brief periods of a week each in other libraries during the course.¹¹ For the schools to be able to do their work adequately, co-operation from special libraries will be essential in providing facilities for periods of practical work. Thought will have to be given to this aspect of the matter and a lead by Aslib encouraging special libraries to help may facilitate the work of the schools. Some general recommendations to ensure that trainees are treated equitably, and to let host librarians know exactly what is required of them, may also be needed. One head of a school of librarianship has defined a suitable library for this purpose as follows:

... one which has high standards of service, an interesting range of services and methods, a chief librarian and senior staff who are enthusiastic about communicating their knowledge to young assistants, and an organized training scheme. As things are, not all these elements are likely to be present in most libraries, but they are the points we should look for.¹¹

6. EXAMINING

There are implications for examiners in that they will be examining students with less practical experience than is customary now. This aspect is of importance but of restricted interest; it is, therefore, not dealt with here.

7. EMPLOYMENT

a. Employment prospects

It is difficult to envisage the extent to which the output of the schools will match the need for qualified librarians in special libraries in the future. It would appear that demand is likely to increase, and Mr D. D. Haslam, Deputy Secretary

of the Library Association, has recently expressed the view that 'the time may not be far distant when at least one hundred newly qualified librarians per annum will be absorbed by special libraries'.¹¹ It is of interest to note that the number of Chartered Librarians at present employed in special libraries in the United Kingdom is 610. It is to be hoped that output will match demand but some action may be needed to control this aspect of the matter. Employers may need some general guidance regarding the implications of the new proposals.

b. Salaries

Special library service can become a real vocation; it is not, however, the kind of vocation that many people are likely to enter completely irrespective of material rewards. In order therefore that recruits to the profession may have factual information regarding their salary prospects, it would seem that we need to know more than we do at present regarding salaries paid to qualified librarians in special libraries. It would appear from information kindly supplied by the Library Association that at present salaries paid to chartered librarians in special libraries vary from £750 per annum to well over £2,000 per annum. The vast majority, however, are in the salary range £1,000 to £1,500 per annum. Doubtless, salaries vary according to age, responsibilities, size of library and other factors. The time has come, however, when we need to carry out a detailed remuneration survey, similar, for example, to those carried out by the Institution of Metallurgists and the Royal Institute of Chemistry. Such a survey could be carried out by the Library Association with perhaps the co-operation of Aslib and the schools of librarianship. There would appear to be urgent need to carry out such a survey in the special library field now and at regular future intervals. It has to be admitted, however, that such a survey would not at present be likely to attract science graduates into the profession. In support of this contention I quote from the 1962 Presidential Address to the Institute of Metals:

From figures collected by the Institution [of Metallurgists], it appears that the industry is providing tangible rewards for its metallurgists that bear comparison with other professions and other industries. For example, 25 per cent of Fellows 45 years old and over enjoy salaries of £3,400 and above; of these 65+ individuals are earning over £4,000, and 40+ over £5,000.¹⁴

c. In-service training

The implementation of the new proposals will produce employees who have followed a complete course of professional study but who have no real practical experience. Short spells of service in a library can hardly be regarded as equivalent to the established service of a full-time employee. Special thought will have to be given to the initial period of full-time employment. Consideration given to in-service training by a Sub-Committee of the Library Association has been reported.¹⁵ While this matter will have to be worked out in practice, library by library, it could be helpful if Aslib, perhaps in association with the library schools, were to work out general principles as to how best to employ

initially in special libraries examined but inexperienced personnel. Should they, for example, be expected initially to perform all or most of the duties expected of present-day junior library assistants, for the sake of experience? Or will this injure their pride? Some generally agreed practice on this point could be helpful. They will clearly need in-service training regarding procedures, facilities, stock, and so on, of the library in which they serve, and will also need to learn as quickly as they can about the activities of the library's parent organization and its subject field. Clear recommendations regarding such matters could facilitate successful employment during the initial stages.

8. GENERAL CONCLUSIONS

The new proposals are a bold venture on the part of the Library Association, offering some hazards but more opportunities. They have as their intended aim the raising of the level of professional qualifications and they merit the support of special libraries. Such support will be essential if special libraries are to gain full benefit from the new provisions. The secret of success lies in gaining full co-operation between Aslib, the Library Association, and the schools of librarianship. It is good to know that arrangements have been made for both Aslib and the Library Association to exchange observers on their respective Education Committees. One further focal point where co-operation may be realized is in the Association of British Library Schools. By means of such co-operation it would be possible to build up confidence in the schools and facilitate their work for special libraries.

For certain posts, where there is higher concentration on scientific information work than on library organization, the qualifications of the Institute of Information Scientists¹⁶ may be thought to be more appropriate than those of the Library Association. It could be useful if Aslib were to issue a statement containing guidance to new entrants and employers as to which qualification is more appropriate in certain circumstances.

ACKNOWLEDGMENTS

The theme of the paper necessitates looking into the future. Being no prophet I have found it necessary to ask the assistance of many associated in one way or another with Aslib, the Library Association, and the schools of librarianship. The paper could not have been written without the generous advice and assistance kindly given by many people in lengthy correspondence and discussion. Although I am Deputy Chairman of the Aslib Education Committee this paper has not at any time been seen by the Committee; the views expressed are personal to the speaker and must not be taken as necessarily committing Aslib, nor those who have helped in the preparation of the paper, in any way.

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DISCUSSION

Many of the special librarians in the audience stressed the point that training for the new Library Association syllabus made it impossible for entrants to qualify by part-time or correspondence courses. It was reiterated that this would adversely affect all entrants to librarianship, especially non-graduates, other assistant grades, and people who wished to qualify late in life.

Although Mr Patrick's paper had deliberately ignored the short-term aspect, several people pointed out that those who had begun to qualify under the old syllabus would be unable to complete their training. Further results predicted were that the standards in special libraries would be lowered, since assistants would tend to remain unqualified, trained only by their employers; and that there would be a reduction in the number attempting to enter the profession. A plea was made by more than one member of the audience for a certificate for Library Assistants.

It was pointed out that the library associations and library schools might find that employers would be unwilling to pay the salaries demanded by the fully qualified professional librarians whom the new syllabus was aimed to produce, but who would, coming straight from a full-time training course, be without any practical experience. These new entrants to special library work

might find that they could not expect to command professional salaries until they had had substantial practical experience. On the question of release for full-time training, special librarians who would be willing to grant day-release to their employees would not necessarily be able to do so for two-year periods; nor would they be able to guarantee vacancies at the end of this training time.

Several representatives of schools of librarianship were present, and they assured the audience that the schools would meet their obligation to provide part-time training for those in the 'pipe-line', and that they would certainly be responsive to constructive criticism from special libraries. It was pointed out that librarianship should be equated with such professions as teaching or medicine, which demanded full-time education, rather than with accountancy or chemistry, which had been cited as parallels in support of part-time training.

Mr Patrick, summing up, said that he felt that the initiative for ceasing part-time training had come from the library schools, not from the Library Association, and that special librarians, if they had any misapprehensions, should rise as a body and ask the schools to continue part-time instruction. He regretted that the meeting had not formulated any recommendations for the guidance of the schools.

Letter to the Editor

KEYWORD-IN-CONTEXT INDEXES

Dear Madam,

The form of keyword-in-context (KWIC) index described in Mr J. D. Black's paper* is the original system devised by Luhn. In the KWIC index system which is in use in this laboratory, we have made a number of modifications to the original version, with the objects of reducing the cost and size of the index and of increasing its utility. We are using the KWIC system to provide an index to those published articles (about 6,000 per year) which are of sufficient interest to this laboratory for their titles to appear in our weekly information bulletin.

The main modifications are:

1. The use of a bibliographic code formed from the volume number of the journal, a mnemonic abbreviation of the journal's name, and the relevant page number. Thus 21-JOC-1141 means volume 21, *Journal of Organic Chemistry*, page 1141. A few special rules have been devised for journals that do not fit this simple pattern. This code can be constructed by the operators in punching the card-input for the system. Because the reference leads directly back to the journal, there is no need for any special bibliographic section to the index or for computer generation of the code.

2. Significant words to appear as entries in the index are chosen from the title by information scientists. Simple underlining of the significant words, which are then preceded by a special character in the punched cards, can be done rapidly. We have found that a practised information scientist can underline significant words in one hundred titles in about ten minutes. The size of the resulting index is only about half that which would be produced by leaving the work to the computer with its relatively short 'stop-list'. Apart from general convenience to the user, this leads to appreciable savings in computer processing time and print-out.

3. Our KWIC index is cumulated every two months, up to the end of each calendar year. Cumulation is a simple computer operation and leads to great convenience in use.

The number of occasions on which we need access via authors' names is so small that we have not thought it worth while to make an author index in the way described by Mr Black.

* *Aslib Proceedings*, vol.14, no.10, October 1962, p.313-21.

Our index is being produced at the IBM Data Centre, London, from cards punched by our own operators. The computer programme for this modified version of KWIC will shortly be available from the IBM 1401 Programme Library.

H. EAST, T. N. SHAW, A. C. SMITH,
Unilever Research Laboratory

Port Sunlight, Cheshire
19th November 1962

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

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TRANSLATIONS, TECHNICAL, SCIENTIFIC, all languages, by specialists with sound technical and scientific qualifications. J. Smuts, BSC(ENG), FIL, 12 Thorndene Avenue, London N11. Stamford Hill 8564.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Roumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

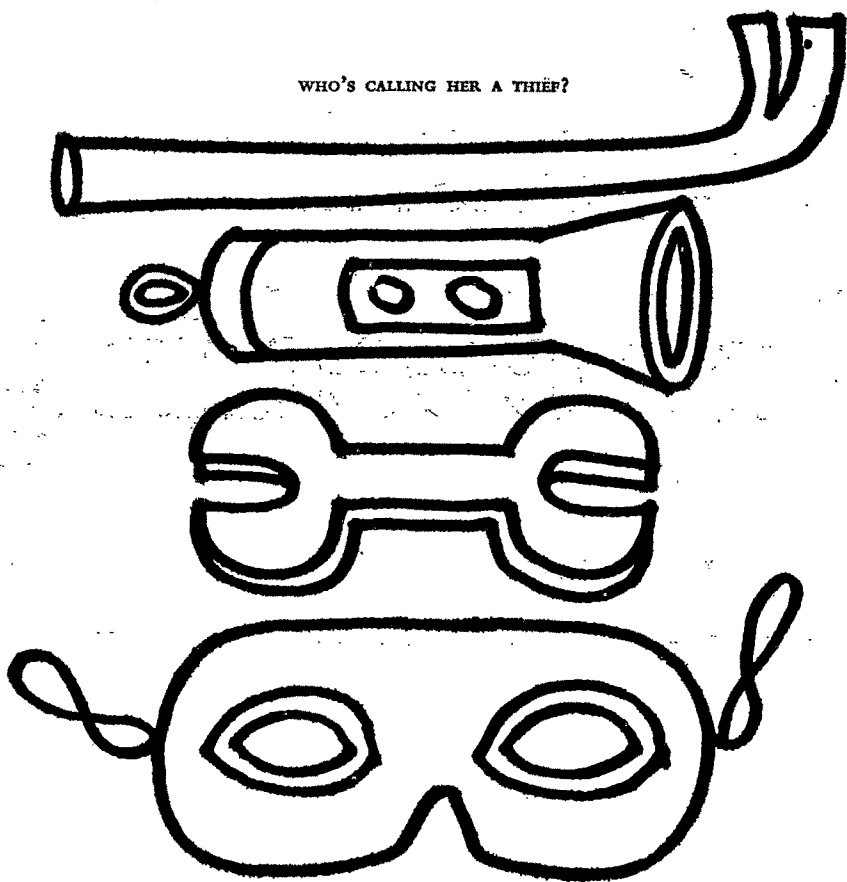
Appointments Vacant

BOVRIL LIMITED. Librarian required for small technical library on food, nutrition, and allied subjects. Duties include the classification and cataloguing of books and reports, literature searching, abstracting and circulation of information, inter-library loans. Applicants should be able to type. Five-day week, canteen, pension scheme, social club, etc. Salary according to qualifications and

Aslib Proceedings

Aslib Proc. vol.15 no.2 p.35-68 London, February 1963

WHO'S CALLING HER A THIEF?



Somebody did. SOMEBODY CALLED JULIAN BLACKWELL. Though, of course, he meant it as a compliment. And he didn't mean she was a thief at all. And in case you think matters are getting confused AT BLACKWELL'S we'd better start at the beginning—which is the old maxim: "set a thief to catch a thief," Translated into 1963 language BY JULIAN BLACKWELL this means: "get a librarian to talk to librarians." Get Mrs. Veasey, Because she has worked for fifteen years on the librarian's side of the fence and knows (almost) all there is to know about it. Get Mrs. Veasey TO BLACKWELL'S because she doesn't have to imagine what librarians like and what they don't like: what they need and what they don't need. She *KNOWS*. SHE'LL SEE THAT BLACKWELL'S KNOW, TOO. Get Mrs. Veasey. Not just because she's a librarian, but because she's a rather specially good one: one who's learned a lot, moved around a lot; one who likes libraries and librarians and stays, decidedly, on their side—even when she operates from a bookshop LIKE BLACKWELL'S. Get Mrs. Veasey. Get Mrs. Veasey "THANK GOODNESS—GOT HER!" SAYS JULIAN BLACKWELL. BLACKWELL'S. BROAD STREET. OXFORD.

ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 15

February 1963

Number 2

ASLIB CALENDAR 1963

February

- WED.20. Economics Group visit to BBC Television Centre.
THUR.21. Winter meeting at Aslib, 5 for 5.30 p.m. 'Getting and using scientific information for the *Financial Times*', by B.C. Boltz.
FRI.22. Northern Branch annual general meeting and public lectures, Sheffield City Libraries, 11.30 a.m. See paragraph below.
Scottish Branch annual general meeting and conference, Scottish Central Library, Lawnmarket, Edinburgh.
WED.27. Economics Group visit to County Hall.

March

- MON.4 - FRI.8. Repeat of senior introductory course to information work.
THUR.14. Aslib one-day conference on co-ordinate indexing systems.
TUE.19. Chemical Group meeting at Aslib, 6 p.m. 'Making your own indexing system', by D. J. Campbell. See paragraph below.
THUR.21. Winter meeting at Aslib, 5 for 5.30 p.m. 'The British National Film Catalogue and its contribution to information', by B. Chibnall. See paragraph below.
MON.25. Midlands Branch annual general meeting, Birmingham. Paper by R. Sheldon on information retrieval.

April

- WED.3. Chemical Group annual general meeting. 'The role of market research in the UK chemical industry', by H. P. Hodge. See paragraph below.
FRI.5 - SUN.7. Aeronautical Group and Engineering Group joint annual conference at Cranfield. See paragraph below.
TUE.23 - FRI.26. Junior introductory course to special library and information work. See paragraph below.
WED.24. Evening meeting at Aslib, 5 for 5.30 p.m. 'Interviewing', by O. J. Whitley. See paragraph below.

Aslib Evening Meetings

The subject of the next meeting, to be held on Thursday 21st March, is 'The *British National Film Catalogue* and its contribution to information'. The speaker will be Mr Bernard Chibnall, B.Sc., Editor of the *British National Film Catalogue*, and the chair will be taken by Mr L. J. Anthony, F.L.A., Librarian of the Culham Laboratory, United Kingdom Atomic Energy Authority.

Mr Chibnall will consider the contribution films can make to all aspects of study—a contribution at present seriously underestimated. The problems of cataloguing films are in sharp contrast to other forms of documentation—for example reference tools, which are taken for granted for printed material, are non-existent for films.

The *British National Film Catalogue*, which is to be launched in March 1963, is part of a programme laid down by the Council of Europe to document all European film production. This plan is of immense importance not only to people concerned with film, but to all who seek information. Aslib has given its support to the plan, and the Director of Aslib is a founder Director of the Company now in process of formation for the purpose of publishing the Catalogue. Mr Chibnall will relate his paper to this new catalogue.

The meeting will be held at 3 Belgrave Square, London SW1, at 5.30 p.m. Tea will be served at 5 p.m. Those wishing to attend are asked to complete and return the enclosed form not later than 15th March.

The April evening meeting will be on Wednesday 24th April. Mr O. J. Whitley, Controller, BBC Staff Training and Appointments, will be the speaker, and his subject 'Interviewing'. Further details will be announced in the March issue of *Aslib Proceedings*.

Northern Branch

The annual general meeting will be held in the Library Theatre of Sheffield City Libraries on Friday 22nd February at 11.30 a.m. In the afternoon there will be a public meeting in the Library Theatre, beginning at 2.15 p.m. The meeting will be held under the auspices of the Northern Branch but will be open to anyone interested in attending. The programme includes a talk on the part played by libraries in National Productivity Year, by Mr J. Bebbington, Sheffield City Librarian and Information Officer; and a debate on the 'European Common Market (pros and cons)' between Mr E. T. Sara, Assistant General Sales Manager of the United Steel Companies Limited, and Mr Michael Barratt-Brown, Lecturer in the Sheffield University Extramural Department. Further details can be obtained from the Hon. Secretary of the Branch, Miss E. Boddy, Edgar Allen & Co. Ltd, Publicity Department, Imperial Steel Works, Sheffield 9.

Junior Introductory Course to Special Library and Information Work

A further course for those who have recently taken up junior posts in special libraries and information departments will be held at Aslib from Tuesday 23rd to Friday 26th April. It is designed to provide those who are engaged on largely routine duties with an understanding of their work and its place in the organization that will help them improve their efficiency and give them the

incentive to progress towards more exacting tasks. The course will include lectures on various aspects of library and information work, visits to representative libraries and information departments, and a final discussion session which will introduce students to the further opportunities for study that are open to them. The fee for the course will be five guineas. A full programme and application form are enclosed in this issue. As the number of places on the course is limited, intending students are advised to book early, and provisional bookings by telephone or telex will be accepted.

Aeronautical and Engineering Groups

The programme for the joint conference on 5th-7th April is now complete and a copy is enclosed with this issue. Reservation forms should be sent to Mr C. W. Cleverdon, Librarian, College of Aeronautics, Cranfield, Bletchley, Buckinghamshire, as soon as possible.

Chemical Group

The next meeting of the Group will be held at 3 Belgrave Square, London SW1, on Tuesday 19th March at 6 p.m. Dr D. J. Campbell, Information Officer of the Pressed Steel Company Ltd, will be the speaker, and his subject 'Making your own indexing system'.

The Group will hold its annual general meeting at 3 Belgrave Square on Wednesday 3rd April at 3 p.m. Mr H. P. Hodge, Manager of the Market Research and Development Division of the Esso Petroleum Company Chemicals Department, will speak on 'The role of market research in the UK chemical industry'.

Technical Translation Group

Two lectures have been arranged for the Group's spring programme. On Thursday 28th March, Mr H. Friedmann of the Holborn College of Law, Languages and Commerce, who is Honorary Secretary of the Audio-Visual Language Association, will speak on 'Audio-visual aids and methods in language teaching', and on Thursday 16th May, Professor R. O. Kapp, who is Chairman of the British Standards Committee on Definition of Units and Symbols, will speak on 'The new Tower of Babel'. Both meetings will be held at 3 Belgrave Square, London SW1, at 4 p.m., and tea will be served at 3.30 p.m.

Retirement of Director of State Library

Georgui Mikhailov Dobrev, the Director of the Vassil Kolarov State Library, Sofia, has recently retired. During a long period of Directorship he has been responsible for many achievements in the development of the State Library and for the building up of library facilities and library education in Bulgaria. He has served librarianship for over fifty years, and all who know him in the international field will wish him well.

'SINTO to BRASTACS'

A conference on the co-operative provision of technical information, entitled 'SINTO to BRASTACS', has been arranged by the Sheffield Interchange Organization (SINTO) for Thursday 21st March. The conference will be held in the Library Theatre at the Central Library, Sheffield 1, beginning at 1.50 p.m. and finishing at approximately 7 p.m. The programme will include a panel discussion by speakers from the eight regional co-operative information schemes in operation at the end of 1962 (representing Bradford, Hertfordshire, Huddersfield, Hull, Liverpool, London, Sheffield, and Tyneside). After tea, Dr D. J. Urquhart of the National Lending Library for Science and Technology will speak on 'Human rats'.

The fee is 7s 6d (for full-time students of librarianship it is 4s) including tea, and prospectuses with application forms and full details are available to anyone wishing to attend from Mr John Bebbington, F.L.A., City Librarian and Information Officer, Sheffield City Libraries, Central Library, Sheffield 1. Members are advised to get in touch with Mr Bebbington as quickly as possible, because the Library Theatre is small and numbers will be limited.

Those in the London area (represented by CICRIS, the Co-operative Industrial Commercial Reference and Information Service) who would like details of travel or overnight accommodation should get in touch with Mr J. W. Thirsk, F.L.A., Borough Librarian, Acton Central Library, High Street, Acton, London W3.

Technical Translating Dictionaries

This is the title of a list of the foreign language technical dictionaries available for reference in the Manchester Public Libraries. It contains a foreword by Mr F. R. Taylor, F.L.A., Technical Librarian of Manchester Public Libraries, on 'Foreign publications in science and technology: the problems of translation and some of the ways in which the technical library can help in overcoming them'. Mr Taylor also refers to the list of technical translators in the Manchester area, kept in the Technical Library.

The list of dictionaries is in two parts. The first is a short list of general technical dictionaries, arranged in alphabetical order. The second and larger part is a breakdown by subject of the three hundred others. Most subjects and languages are covered in this collection—which is being continually added to. The largest holdings are in French, German, Russian, and Spanish. A fair proportion of the dictionaries are foreign publications.

Finally there is a language index, indicating whether the dictionary is from or into English, or if English is not used at all. The list, published in 1962, is obtainable from Manchester Public Libraries, Central Library, St Peter's Square, Manchester 2, and the price is 1s 6d (post free).

New Information Journal

The Pergamon Press has published the first issue of a new quarterly journal, *Information Storage and Retrieval* (vol. 1, no. 1, January–March 1963). The Editor-in-Chief is Mr J. E. L. Farradane, and the Regional Editors are M. Eric de Grolier, Dr R. M. Hayes, Professor A. I. Mikhailov, Professor Dr E. Pietsch,

and Dr S. Yosioka. The object of the journal is to 'provide a medium for the publication of advances in theory and techniques relating to information storage and retrieval, with special consideration of scientific information and the intellectual problems involved'. On the theoretical side, the research covers new departures in indexing, classification and notation, recording and disseminating information, and the application of such disciplines as experimental psychology, semantics, linguistics, logic and information theory. The techniques include methods of recording and transmitting information, punched card methods, mechanical and electronic selectors, and mechanical translation. The annual subscription for libraries, government establishments, research laboratories and other organizations is £10; for individuals who place their orders directly with the publisher and certify that the journal is for their personal use, it is £5.

Research ceases Publication

The Editor of *Research, applied in Industry* has announced that his journal has ceased publication with the issue for December 1962. The journal was started to help introduce the 'pure' to the 'applied' sciences and to try to set before the 'pure' some of the problems of the 'applied'. It is now considered that the original purpose of the journal is too wide, and that scientific writing must become more specialized.

Bell Telephone Laboratories Booklet

Bell Telephone Laboratories have published a new edition of an illustrated booklet describing the work and organization of their technical information libraries. A small stock of copies is available for distribution, and librarians who would like a copy should write to Mr W.K. Lowry, Manager, Technical Information Libraries, Bell Telephone Laboratories Incorporated, Murray Hill, New Jersey, USA.

Information Processing Journal

The Cambridge Communications Corporation has announced the publication of a new periodical, *Information Processing Journal*. This is intended to 'bring together each month hundreds of brief but informative summaries of published papers, books, conference proceedings, government and company reports and patents'. Each issue will contain a 'highly detailed' subject index which will be cumulated each year. Subscriptions should be sent to the Cambridge Communications Corporation, 238 Main Street, Cambridge 42, Massachusetts, USA; the rates are \$60 for one year or \$165 for three years in the United Kingdom and Europe, and \$50 or \$135 in the United States and Canada.

1962 Review of Equipment for Microtext

For the last seven years Mr Geo. H. Davison has published annual reviews of progress in the field of microcards, microfiches, aperture cards, and the like, as well as of reading and enlarging equipment. Now, Microcard Editions Inc., of Washington, DC, is publishing an annual *Guide to Microforms in Print*, Micro

Methods Ltd (and others) are publicizing microtext produced in Great Britain, and the National Microfilm Association in the United States is publishing details of American equipment in its *Guide to Microreproduction Equipment*. For these reasons, Mr Davison intends in future to confine himself to an annual review of equipment appearing in Britain or on the Continent. The *1962 Review of Equipment for Microtext* is published by the Council for Microphotography and Document Reproduction, The Library Association, Chaucer House, Malet Place, London, WC1, price 10s to members of the Council, 14s to non-members.

IBM Research Fellowship

IBM United Kingdom Limited are inviting applications from universities and university colleges in the United Kingdom for their third, 1963, IBM United Kingdom Research Fellowship. This is a three-year fellowship, worth a total of £3,570. There is no restriction on the subject of research.

Formal application should be made to Dr H. S. ApSimon, IBM United Kingdom Limited, 101 Wigmore Street, London W1, by 28th February. A leaflet setting out the information needed to accompany applications is available on request to Dr ApSimon.

The first, 1961, fellowship is held at the Department of English Language and General Linguistics at the University of Edinburgh. The second, 1962, is held at the Faculty of Physical Sciences at Oxford by Mr J. P. A. Deutsch, a mathematician from the London Transport Executive electronic data processing unit; Mr Deutsch is studying the application of mathematics to transport problems.

CO-ORDINATE INDEXING

A Bibliography based on Material in the
Aslib Library in December 1962

compiled by

P.L.ERSKINE, B.A., B.L.S.
Librarian, Aslib

INTRODUCTION

THE search for an easily installed, practicable and inexpensive information retrieval system continues unabated. This is reflected in the Aslib Library almost daily by requests for advice on the feasibility of installing this or that system, or for information on what systems are available in Great Britain. Study of the following bibliography, which covers only a narrow selection of information retrieval systems, will reveal that much original thought has been producing concrete results in this country. In fact, one of the earliest references is to a paper given at the twenty-second Aslib Conference in 1947 by W.E. Batten, in which he describes his development of an 'aspect' card system—more often referred to today as 'Peek-a-boo' or 'feature' cards. Mr C. W. Cleverdon's Cranfield project is also adding considerable knowledge on the use of various indexing methods, including Uniterm.

In the search for knowledge about information retrieval systems, many people, because of the widespread use of the magic word 'Uniterm', have acquired an assumption that, given time and money, the installation of a Uniterm system will solve all their problems. Often they are rather nonplussed to find that the system they call 'Uniterm' is in fact 'Peek-a-boo' or some other variant of co-ordinate indexing. In order to encourage a further understanding of the many types of co-ordinate indexing, to stimulate deeper study of the subject and, in a few cases, to help librarians and information officers to develop a system within their organization, this bibliography has been prepared. It is based primarily on material in the Aslib Library.

In addition, two conferences arranged for 1963 will undoubtedly give further stimulus to the search for knowledge about co-ordinate indexing systems. At the first, held on 5th February, Mr Cleverdon and his staff discussed the results of their four years of investigation, and the future of the Aslib Cranfield Research Project. And on 14th March Aslib is to hold a conference on co-ordinate indexing systems. Some of the participants have already published papers on the subject—B.C. Vickery, G.M. Boyd, A. Johnson, J.L. Jolley—and the conference will provide them with the opportunity to discuss many of the aspects covered by the papers in this bibliography, and to develop ideas contained in their earlier published work.

Some co-ordinate indexing systems mentioned in the bibliography are available commercially, and further information may be obtained as follows:

1. La Phototechnique, 6 rue Dombasle, Paris XV^e, for a description of the *Cordonnier* system.
2. IBM British Laboratories, Hursley House, Hursley Park, Winchester, Hampshire, for *IBM* cards and equipment.
3. *Peek-a-boo* or feature cards are supplied in the United Kingdom by Carter-Parratt Ltd, Iddesleigh House, Caxton Street, London, SW1, and by Manifoldia Ltd, Manisort Division, West Bromwich, Staffordshire.
4. The *Termatrex* system is available from Jonker Business Machines Inc., 26 North Summit Avenue, Gaithersburg, Maryland, USA.
5. The *Uniterm* system is designed by Documentation Inc., 7900 Norfolk Avenue, Bethesda, Maryland, USA.
6. *Zatoperk* cards and the *Zatocoding* system are available from the Zator Company, 140½ Mount Auburn Street, Cambridge, Massachusetts, USA.

A. MANUAL SYSTEMS

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 - I Alphabetical correlative indexes.
 - II Correlative trope indexes.
 - III Semantic relations among Semantemes: the technical thesaurus.
By C. L. Bernier and K. F. Heumann.
 - IV Correlative chemical-group indexes.
 - V The blank sort.
 - VI Serendipity, suggestiveness, and display.
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In test of Uniterm indexing vs. regular AEC catalog indexing, Uniterms took more time.

Letters to the Editor

LIBRARY EXAMINATION SYLLABUS

Dear Madam,

It was obvious from last Monday's meeting* on the implications to special librarians of the new Library Association examination syllabus that many special librarians are far from happy about the reduction in the facilities for part-time study. In his concluding remarks the speaker suggested that it was up to 'us' to make a strong representation to the library schools requesting that part-time tuition facilities continue to be made available, but no opportunity was provided for a motion to be put to the meeting. The purpose of this letter is to inquire whether Aslib proposes to take any action in view of the obvious unrest; if necessary, a questionnaire could perhaps be circulated to members, as is being done by the Northern Branch. Most librarians would agree that full-time study is desirable wherever possible, but it is, after all, feasible to study part-time for a university degree, so why not for librarianship qualifications?

I should like to make it clear that I have no complaints against the revised syllabus as such; I consider this to be a vast improvement on its predecessors (apart from the fact that it is now possible to become a qualified librarian without knowing anything about classification and cataloguing). What does worry me is that very many library assistants now 'in the pipeline' are going to be robbed of the opportunity of becoming qualified. Also, we are going to be faced in the future with the alternatives of employing either fully qualified librarians or inferior clerical assistants, with the result that: *a*, there will probably be even fewer qualified librarians in special libraries than at present because assistants who have been unable to qualify will be promoted to senior posts; and *b*, standards of service in many libraries, including my own, which will have to replace 'semi-professional' assistants with clerical assistants, must deteriorate. Why should it not be possible for the keen assistant to study part-time for the new Intermediate Examination and leave it at that? Mr Patrick thinks the creation of such a 'middle grade' might 'degrade' the profession, but surely this is poppycock.

I am sending a copy of this letter to the Library Association's Education Officer.

Yours faithfully,

K. G. B. BAKWELL,
Librarian.

British Institute of Management,
London EC4
29th November 1962

Editorial note. The Aslib Education Committee has discussed the points raised as a result of Mr Patrick's paper, and has decided to make a thorough study of the position. A questionnaire will be sent to all members to find out what their views and requirements are, and information on courses to be offered will be requested from the library schools. On the basis of the information collected, the Committee hopes to be able to recommend action aimed at overcoming the difficulties.

* Aslib winter meeting, 26th November 1962. 'Some implications of the new Library Association examination syllabus from the special library viewpoint', by L. G. Patrick. Published in *Aslib Proceedings*, vol. 15, no. 1, January 1963, p. 18-30.

THE FOREIGN LANGUAGE BARRIER

Dear Madam,

When reading Dr Holmstrom's otherwise unexceptionable paper on 'The foreign language barrier' in the December 1962 issue of *Aslib Proceedings*, I was somewhat taken aback to find that he attributes (p. 415) the damage done to science, human enlightenment and progress in general by the multiplicity of tongues to 'the imprudence of the Israelites in starting to build a Tower of Babel'. I hope that, as a translator and an Israelite, I may still rate as sufficiently disinterested to be allowed a word of mild protest here. If the learned author of *Facts, files and actions* will check his facts, he will discover that the Bible simply calls the tower-builders 'the children of men' (Genesis XI, 5). It could hardly be otherwise: the traditional date for the Tower of Babel is 2247 BC, whereas Jacob, whose sons were the fathers of the Twelve Tribes of Israel, was not born until 1837 BC.

The medieval commentator Ibn Ezra put forward the interesting theory that the Tower of Babel was undertaken as a collective project to emphasize the continuing unity of the survivors from the Flood. It was destroyed, and diversity of tongues introduced, to ensure adequate population scatter, and prevent the frustration of the charge to Noah and his sons to 'replenish the earth' (Genesis IX, 1). Dr Holmstrom has graphically illustrated the success of this measure; we may hope it will be considered sufficient not to warrant any further interventions, if the assault on the foreign language barrier should come within sight of success!

Yours sincerely,

HAROLD A. MEEK.

81 Lansdowne Road,
Belfast 15
3rd January 1963

Dear Madam,

The report of my contribution to the discussion on Dr Holmstrom's paper to the 1962 Aslib conference (*Aslib Proceedings*, December 1962, p. 425) seems to mean exactly the opposite to what I actually said. Since I believe that the point I was trying to make is a fairly important one, may I reiterate it here?

A recent American paper has shown that in American physics journals approximately 85 per cent of the references quoted by authors are to articles in American and British journals (75 per cent are to articles in American journals) whereas in Russian physics journals only 45 per cent of the references are to articles in Russian journals. Clearly the Russians are making far more use of foreign language literature than are the Americans.

If we accept the proposition (which no one at the conference seemed to dispute) that the research effort in any particular field can be seriously handicapped by lack of awareness of the work being done in non-English speaking countries, how can we explain the fact that, generally speaking, American science and technology is still leading the field, although, apparently, sublimely indifferent to what goes on in the world outside? Is it not possible that the

English-speaking population of the world is so large that it is almost self-sufficient from the point of view of research and experiment, or, at any rate, that it produces so much information that few individual scientists within this group have either the time or the need to go outside it?

I do not pretend to know the answers to these questions but I do suggest that we may be attaching too much importance to the translation problem and that, if we ever embark on wholesale machine translation of foreign literature we may find that the cost of such a programme exceeds the value of the information so obtained.

Yours faithfully,

L. J. ANTHONY,
Librarian.

UKAEA Culham Laboratory,
Culham, Abingdon, Berks.
10th January 1963

SOURCES OF STATISTICS IN COMMON MARKET COUNTRIES

The Netherlands Central Bureau of Statistics has drawn our attention to an error in the appendix to 'Statistical and other information sources' (Conference on the Common Market, *Aslib Proceedings*, vol. 14, no. 6, June 1962, p. 166).

The only publications actually listed by title are those under Industrial Statistics (Statistiek van de Industrie). The other references are, in fact to the divisions of the Central Bureau of Statistics, each of which issues several publications in its respective field.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

Books and Pamphlets

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Standards of public library service in England and Wales: report of the Working Party appointed by the Minister . . . in March 1961. London, H.M.S.O., 1962. vii, 123 p. tables. 7s.

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Proceedings, papers and summaries of discussions. . . . London, 1962. 116 p. 5s 6d.

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Cataloging made easy. New York, Scarecrow Press, 1962. 210 p. 50s.

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Notes for tutors: the study of reference material, by R. C. Bengé. 2nd rev. ed. Purley, Library Association, London and Home Counties Branch, 1962. 33 p. 2s 6d.

STROMEYER, RAINALD

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MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 5 Stratton Close, Hounslow. Hounslow 6954.

TRANSLATIONS, TECHNICAL, SCIENTIFIC, all languages, by specialists with sound technical and scientific qualifications. J. Smuts, BSC(ENG), FIL, 12 Thorndene Avenue, London N11. Stamford Hill 8564.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Roumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

Appointments Vacant

ASLIB LIBRARY. A CHIEF ASSISTANT is required to take charge of the library under the personal supervision of the Research Librarian. Active interest in the subject of documentation, technical and otherwise, and a dynamic attitude to library and information services are essential. A university degree, librarianship qualification, and knowledge of languages are very desirable. This post calls for sustained creative work, not merely good routine administration, and salary and conditions of work are excellent. Apply to the Director, Aslib, 3 Belgrave Square, London SW1.

ASSISTANT LIBRARIAN required at the NATIONAL COAL BOARD'S MINING RESEARCH ESTABLISHMENT, Worton Hall, Isleworth, Middlesex. Applicants should be Associates of the Library Association; technical library experience would be an advantage. Five-day week, three weeks' paid holiday. Appointment superannuable and salary according to qualifications and experience within £710-£872. Write for application form to Personnel Officer at the above address, quoting ref. X180C.

BEA. An ASSISTANT LIBRARIAN is required for the library at our Engineering Base, London Airport, to undertake duties which include responsibility for a reference section and control of inter-library loans. Applicants should have completed the Registration Examination of the Library Association or have passed at least three parts including

Groups B and C, and should have at least three years' experience in a technical or public library on work of a similar nature. Commencing salary £12 4s rising by annual increments to £16 13s 6d. Apply Personnel Officer (Administration Offices), British European Airways Engineering Base, London (Heathrow) Airport, Hounslow, Middlesex.

EXPANDING FIRM in City of London needs woman INFORMATION OFFICER/SENIOR LIBRARIAN to take charge of specialist library covering wide range of economic and industrial subjects. She will be responsible for unskilled staff of five and work includes circulation, editing, abstraction, information searches, etc. Age and experience considered, but more important initiative, flexibility, and willingness to take responsibility. Initial salary £1,000 to £1,500. Apply Box 163, Aslib.

RESEARCH ASSISTANT, Croydon. The ideal applicant for this post with NOBLE LOWNDES & PARTNERS LTD, pension consultants and insurance brokers, will be in his or her early 20's with a sound all-round education; have some useful experience of special library work with a marked commercial bias; have some knowledge of insurance matters (although this is not essential), and be accustomed to or capable of supervising the activities of a small group of people. He or she must be a self starter. The post carries a salary of around £700 and comprehensive employee benefits. Please write in confidence to the Staff Manager, Noble Lowndes & Partners Ltd, Norfolk House, Wellesley Road, Croydon, Surrey.

RESEARCH ASSOCIATION OF BRITISH FLOUR-MILLERS. LIBRARIAN required for small scientific library. Must have science degree and a working knowledge of German and French would be an advantage. Salary (carrying FSSU) dependent on experience. Apply Director of Research, Cereals Research Station, Old London Road, St Albans.

TECHNICAL INFORMATION. A vacancy for a Technical Assistant (male or female) occurs in the library of the research organization of SMITH & NEPHEW ASSOCIATED COS LTD. A general science degree is required and library experience, together with a knowledge of at least one foreign language, is desirable. Duties will include abstracting, indexing, and bibliographical work. Preference will be given to applicants under 35 years and salary will be according to age, qualifications, and

Aslib Proceedings

incorporating Aslib Information

Library Services as an Aid to Productivity

NORTHERN BRANCH CONFERENCE NOVEMBER 1962

MIDLANDS BRANCH CONFERENCE DECEMBER 1962

Can 'the Literature' be Readable?

MAGNUS PYKE

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc.

vol.15 no.3 p.69-96

London, March 1963



THE FOREIGN SECRETARY MIGHTN'T AGREE

When the Foreign Secretary sends an ambassador to Ethiopia, he sends an Englishman, just like himself. That's one way of operating. But there's another way RECENTLY ADOPTED BY BLACKWELL'S when you send an ambassador who's like the people you've sent him to see. Right now, an ambassador is setting out to see librarians FROM BLACKWELL'S and, in the first place, he's a "she". And in the second place, she's a librarian herself, AND THE FACT THAT SHE IS WORKING FOR BLACKWELL'S WON'T CHANGE THAT. May interest you to know that her name is Irene Veasey and she can hold her own with the experts on subjects like information retrieval, abstracting, or library administration. She has also been known to drink a pint of beer in seventeen seconds and swim before breakfast in October. JULIAN BLACKWELL IS NOT SURE HE CAN COMPETE ON ANY OF THESE SCORES—EXCEPT THE LAST. Impossible to conceal the fact that Mrs. Veasey is library-orientated, and whether she's staying home AT BLACKWELL'S or travelling as their ambassador—she is carrying the librarian's point of view. She says she can't lose it now, not even if she tried. AND IF SHE DOES TRY, JULIAN BLACKWELL SAYS HE'LL FIRE HER.

BLACKWELL'S. OXFORD. ENGLAND.



ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 15

March 1963

Number 3

ASLIB CALENDAR 1963

March

- TUE.19. Chemical Group meeting at Aslib, 6.15 p.m. 'Making your own indexing system', by D. J. Campbell.
- THUR.21. Winter meeting at Aslib, 5 for 5.30 p.m. 'The British National Film Catalogue and its contribution to information', by B. Chibnall.
- MON.25. Midlands Branch annual general meeting, Engineering Centre, Birmingham, 6.15 p.m. Paper by R. Sheldon on information retrieval.
- THUR.28. Technical Translation Group meeting at Aslib, 3.30 for 4 p.m. 'Audio-visual aids and methods in language teaching', by H. Friedmann.

April

- WED.3. Chemical Group annual general meeting. 3 p.m., 'The role of market research in the UK chemical industry', by H. P. Hodge.
- FRI.5 - SUN.7. Aeronautical Group and Engineering Group joint annual conference at Cranfield. See paragraph below.
- TUE.23. Midlands Branch meeting at Coventry.
- TUE.23 - FRI.26. Junior introductory course to special library and information work.
- WED.24. Evening meeting at Aslib, 5 for 5.30 p.m. 'Interviewing', by O. J. Whitley. See paragraph below.
- THUR.25 - SAT.27. Northern Branch conference at Harrogate.

May

- WED.1. Scottish Branch visit to British Hydrocarbon Chemicals Ltd.
- TUE.7. 'Information on a shoestring' course for part-time information workers at Nottingham. See paragraph below.
- THUR.16. Technical Translation Group meeting at Aslib, 3.30 for 4 p.m. 'The new Tower of Babel', by Professor R. O. Kapp.
- TUE.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'From Patent Office Library to National Reference Library of Science and Invention', by Miss M. Webb.

Evening Meeting

The evening meeting for April will be held on Wednesday 24th April at 3 Belgrave Square. Mr O. J. Whitley will be speaking on 'Interviewing', and Mr Leslie Wilson, the Director of Aslib, will be in the chair. Mr Whitley is Controller of Staff Training and Appointments at the British Broadcasting Corporation. He describes the interview as a 'dialogue' and will compare the different kinds of interview and their relative merits and weaknesses. The meeting will take place at 5.30 p.m. and tea will be served at 5 p.m. Those wishing to attend are asked to fill in the enclosed application form and return it to Aslib, 3 Belgrave Square, London SW1, not later than 11th April.

Aeronautical and Engineering Groups Conference

There has been a change in the list of speakers at the joint conference 5th-7th April (announced in the January issue of *Aslib Proceedings*), and Mr K. Smith will now take the place of Mr E. G. C. Burt. Mr Smith will speak on 'The ELDO satellite launching vehicle'.

The other speakers' subjects will be as follows. Mr M. Day's will be 'Publication announcement services in the aerospace sciences'; Mr A. Chinneck will give 'A brief account of the working of the Aeronautical Research Council'; Mr F. B. Roberts will speak on 'Technical information: periodicals, purveyors and users'; Mr C. Gibbs-Smith on 'Writing and illustrating aeronautical history'; and Mr J. Mills will give an account of 'The present work of the Aslib Cranfield Project on Indexing'.

Copies of the programme and application form can be obtained from Mr C. W. Cleverdon, Librarian, College of Aeronautics, Cranfield, Bletchley, Buckinghamshire.

Film Production Librarians Group

The annual general meeting will be held on Wednesday 10th April, at 6.45 p.m., in Room 103, Shell-Mex House, Strand, London WC2. Details may be obtained from the Hon. Secretary of the Group, Mrs Anne Hanford, BBC Television Film Studios, Ealing, London W5.

Nottingham Technical Information Week

A Technical Information Week will be held in Nottingham from 6th to 11th May as part of National Productivity Year, to show people in industry how they can help to increase productivity by the efficient use of technical information.

During the week Aslib will be putting on its successful course *Information on a shoestring*, which is intended to help people in organizations without established information departments to find information or to get hold of publications or documents of importance to their work. This course will be held in the Midland Design and Building Centre, Mansfield Road, Nottingham on Tuesday 7th May. A full programme is enclosed with this issue, and applications should be made to the Education Officer, Aslib, on the form provided. The fee for the course, which includes a buffet lunch, is 3½ guineas to members of Aslib and 5½ guineas to others.

The North Midlands Group of the Reference, Special and Information Section of the Library Association will be holding a half-day conference entitled *Information, libraries and productivity* at 2.30 p.m. on Wednesday 8th May, also in the Midland Design and Building Centre. The speakers will be Mr D. Morgan, Information Manager, Production Engineering Research Association, Mr H. H. Goom, Librarian and Information Officer, GKN Research Ltd, and Mr F. C. Tighe, City Librarian of Nottingham. Each will outline the ways in which his library can contribute to increased productivity. Members of Aslib are invited to attend this meeting.

During the whole week, and until 15th May, an exhibition prepared by the National Book League on the theme *Books in industry* will be on display in the Central Library in South Sherwood Street, Nottingham.

Sheffield University School of Librarianship

The Director of Sheffield University's new Postgraduate School of Librarianship is to be Mr W. L. Saunders, M.A., F.L.A. Mr Saunders comes to this post after a wide range of library experience. After being Deputy Librarian of the Institute of Bankers he was for seven years Librarian of the University of Birmingham Institute of Education, which he left in 1956 on appointment to his present post as Deputy Librarian at the University of Sheffield. He has just returned from a year in East Africa where, under the auspices of Unesco, he has been establishing an Educational Documentation Centre at Kampala. He will take up his appointment on 1st April.

A large, pleasant house near to the university is being prepared as the School's first home, and it is expected that courses will commence some time during 1964. Students will be graduates, reading for a Diploma in Librarianship, and full details of the syllabus will be worked out during the next few months. While the main object of the course will be to produce librarians capable of working in libraries of any type, Aslib members will be interested to know that a strong course in special library work will be one of the principal options. Sheffield is an ideal centre for this type of activity and it is hoped that a good proportion of the students will have a scientific or technological background.

Ld Classification à Facettes

Mlle Paule Salvan, who in 1962 described the work of the United Kingdom Classification Research Group in an article 'Les progrès de la classification à facettes' in the *Bulletin des Bibliothèques de France* for January 1962, has now translated B. C. Vickery's book, *Faceted classification: a guide to construction and use of special schemes*, prepared for the Classification Research Group (Aslib, 1960). This is a welcome step in the direction of better understanding and co-operation between those in different countries studying and carrying out research into classification and indexing problems. Another example is Unesco's publication in English of Eric de Grolier's masterly synthesis *A study of general categories applicable to classification and coding in documentation* (Unesco, 1962). Such handbooks are essential background information to those preparing for the Second International Classification Research Conference to be held under the aegis of

FID in 1964 (the first was held in Dorking in 1957 and the proceedings were published by Aslib).

La classification à facettes is published by Gauthier-Villars and the price is 9 francs.

Publicaciones Periodicas y Seriadas

As part of the inter-American library development programme of the Pan American Union, a series of manuals in Spanish for the practising librarian and for the teaching of library science, entitled *Manuales del bibliotecario*, is being published by the Union. One of the most needed manuals in Spanish is one on the treatment and use of periodicals and serials in libraries, and a survey was made of existing manuals on the subject. David Grenfell's *Periodicals and serials*, published by Aslib in 1953, was found to be the most useful for practical approach and brevity, and the Union sought permission from Aslib and the author to produce a Latin-American edition for inclusion in their series. This was granted, and *Publicaciones periodicas y seriadas*, translated and adapted by Jorge and Berta Grossmann, has made its appearance as no. 2 in the series.

Sr. Jorge Grossman is a librarian and the compiler of the *Directory of current Latin American periodicals* issued by Unesco. His wife is bilingual and has had considerable experience of the library world. Translation was not easy owing to the limitations set by Spanish terminology in this field. A fairly literal translation has been made of the major portion of the text, with the addition of references appropriate to serials work in Latin America. The appendixes have been revised to include material of special interest to Latin American libraries. The editors have provided footnotes wherever necessary to assist Latin American readers.

Statistical Methods in Linguistics

Statistical Methods in Linguistics is a new journal published in Stockholm and containing articles in English, German, and French. The editor is Hans Karlgren, who writes in his introduction that 'the statistical approach is likely to prove fruitful to linguistics of today. Also, statistical analyses are indispensable preliminaries to and part of research for machine translation. For these reasons, linguists, statisticians and data processing experts from all the Scandinavian countries were invited to a Symposium at Sundbyholm Manor in November 1960. The interest shown was overwhelming, and the number of requests for material and enquiries made by scholars who could not attend in person has been very great indeed, and increasing. That's why this journal appears.'

There will be two issues a year. The annual subscription is \$5.50, or \$3 for each separate issue. Microfiche cards containing supplements to the articles (tables and other primary data) will be sent on request at a cost of \$1 per article (\$0.50 to subscribers) plus postage; or all cards can be supplied with the journal at a total subscription rate of \$9.50 a year. Subscribers will also be entitled to a free bibliographical service. The bibliography will be in the form of library cards, and will cover important new literature as well as older literature. Subscription orders should be sent to Språkförlaget Skriptor, postal account nr. 60 76 11, Stockholm, Sweden.

International Association of Music Libraries Conference

To mark the tenth anniversary of the formation of the United Kingdom Branch of the International Association of Music Libraries, a week-end conference of music librarians and their associates will be held at Manor House, Northfield, Birmingham, from Thursday 18th to Monday 22nd April. The theme of the conference is 'Music library services in the 1960's'. There will also be visits to Birmingham University, the Barber Institute of Fine Arts, and to some Oxford music libraries. The conference fee is one guinea for members and 3 15 6d for non-members of the Association, and the cost of accommodation will be 40s a day. The closing date for applications is 28th March. Further information and copies of the programme may be obtained from Mr Walter H. Stock, Hon. Secretary, UK Branch, c/o The Royal Academy of Music Library, Marylebone Road, London NW1.

British Museum Reading Room

The Trustees of the British Museum have announced that the Reading Room will be closed for redecoration during the autumn of 1963. The work will begin in October and the Reading Room will be out of use for about four months. As many readers as possible will be accommodated in other rooms, but the total number for whom places can be found is likely to be reduced by nearly half, and some curtailment of other services will also be unavoidable.

Students and research workers and other regular users of the Reading Room are asked to adjust their plans as much as possible to avoid relying on its services during this period. Both the Reading Room and the North Library will be open, in 1963, during the week beginning with the first Monday in May, when they would normally have been closed for cleaning.

Does your Firm need its own Information Service?

This booklet, published by the Organization for Economic Co-operation and Development for whom it was prepared by the Aslib Research Department, is at present being reprinted, supplies of the English edition having been exhausted. HMSO, the sole agents in this country for OECD publications, inform us that they are awaiting fresh supplies, and that all orders already received by them will be filled as soon as possible. The booklet can be ordered from any Government bookshop, price 5s.

Library Resources in the West Midlands

The West Midlands Group of the Library Association Reference, Special and Information Section is to produce a revision of *Library resources in the West Midlands*. This was originally published by the Library Association in 1958 and aims to list as fully as possible all types of libraries in the five counties of Herefordshire, Shropshire, Staffordshire, Warwickshire, and Worcestershire. Details of their stock, their specialities, and the services they offer are collected by questionnaire. The revised version will have a wider coverage, and the editor

would be glad to hear of any libraries which were not included in the first edition. Letters should be addressed to Mr B.G. Staples, Reference Library, Ratcliff Place, Birmingham 1.

Report on Co-ordinate Indexing

Members who are interested in the *State of the art of co-ordinate indexing* which was announced in *Aslib Proceedings* October 1962, p. 311, are asked to note that the order number is AD 275393 (not AD 274393 as originally stated). It is available in mimeographed form at \$4, from the Office of Technical Services, Department of Commerce, Washington 25, DC.

European Industry and its Literature

This is the subject of a symposium to be held by the North-Western Polytechnic on Friday 17th May. Four papers will be given, and the symposium will take place at the Library Association's headquarters at Chaucer House, Malet Place, London WC1. Full details and application forms may be obtained from Mr J. Burkett, Department of Librarianship, North-Western Polytechnic, Prince of Wales Road, London NW5.

ASLIB NORTHERN BRANCH CONFERENCE

Library Services as an Aid to Productivity

Bradford, 16th November 1962

THE Northern Branch held a one-day conference in the Textile Lecture Theatre of the Bradford Institute of Technology on 16th November. Three papers were given, and summaries are published below. In opening the conference the chairman of the branch, Mr George H. Davison, of the United Steel Companies Limited, spoke about National Productivity Year and the ways in which the papers to be given could be related to the productive effort of the community and to the improvement of the level of production.

INDEXING METHODS ADOPTED BY LLOYD'S REGISTER OF SHIPPING

G. M. BOYD, O.B.E.

Technical Records Officer, Lloyd's Register of Shipping

SUMMARY

A co-ordinate system with edge-punched item cards has been in use at Lloyd's Register of Shipping for about fifteen years, for indexing their surveyors' reports.

More recently, they have adopted the same principle—but with body-punched feature cards—for indexing general technical literature. For this, a list of 427 descriptors, or features, has been drawn up. The feature cards, which have ten thousand item positions, were specially designed and made in plastic material, and a special punching device has been developed.

The system, which is described in full in *Engineering*, vol. 194, no. 5036, 26th October 1962, p. 545-8, has been in satisfactory operation for about four years, and contains over 18,000 entries.

THE INDUSTRIAL LIBRARY: A LUXURY OR AN ESSENTIAL SERVICE?*

L. TAYLOR

Group Librarian, Ferranti Ltd

SUMMARY

This paper takes as its norm a library service to a firm employing up to about five hundred personnel, and it is presumed that the managements of these industrial organizations regard the library as a luxury and are little concerned with community responsibilities and the distribution of those responsibilities

* The full text of this paper may be borrowed from Aslib Library.

between departments. As a contribution to the National Productivity Year it would be useful for the librarians of these organizations to make a reappraisal of the services they provide. To management, the library means books and periodicals; the librarian must try to widen this conception by providing, on an anticipatory basis, all kinds of information—economic, commercial, and ‘shop floor’, as well as technical. The cost factor is still difficult to estimate, but investigation by a non-library organization, correlated with the researches of the Organization for Economic Co-operation and Development, may provide an empirical means. Assessment of the financial value of the output is even more problematic, but recommendations towards improving library productivity include: a readier recognition of the ‘service’ nature of the department; less addition to procedures and reader ‘regimentation’; reduction of routine, to provide opportunities for anticipatory and disseminatory services; and acceptance of the responsibility to extend personal subject knowledge.

Some means of measuring the library’s success are required. As an initial step might not Aslib investigate the optimum proportions of staff time to be devoted to routine procedures, and analyse the division of labour between acquisition, storage, retrieval, and dissemination?

LANGUAGE REQUIREMENTS OF THE INFORMATION OFFICER*

R. SEWELL

Information Officer, The United Steel Companies Limited

SUMMARY

I would really prefer to call this paper ‘Ways in which the information officer should use languages’. The first point to stress is that languages cannot form the basis of a career, they are merely a useful asset and only useful if known properly. The chief ways in which information officers can put their knowledge of foreign languages to use are verbal translating, interpreting, letter writing, and making social contacts while visiting abroad and with visitors to this country. Secondly, there is far too much talk about how to teach and learn and how useful languages are, and not enough people who are really sharpening up their knowledge of languages, which means hard work. Certainly, one must not get the language problem out of proportion; it must be realized that only a small fraction of one per cent of the results of research efforts each year produce absolutely new knowledge. The important thing is to develop and apply ideas which are current throughout the world in one’s own particular spheres of industry and science. Hence it is useful for the information officer to be able to handle foreign information.

Language knowledge, however, is only really useful if one can read the relevant language as easily as English. I think that a very minimum of two languages is necessary to be useful, and if possible it should be three or more. It is useless to spend hours with a dictionary or a foreign article to make an abstract. One should be able to skim through it, as in English, and dictate the proper gist of it.

* The full text of this paper may be borrowed from Aslib Library.

At least a degree standard of knowledge—gained either in an orthodox way in a university or by long and continuous interest in languages—plus an experience of the firm's interests, products, and processes is required.

A final major fallacy is to think there is a difference between technical Russian and ordinary Russian, or between technical German and ordinary German. It is absolutely essential to know the language and make it one's own. Any specialist can pick up his own technical jargon in the language quite easily—it is merely a question of learning vocabulary—but those who think they can learn technical vocabulary but only a minimum of the mechanism of the language will certainly fail. I have seen this happen many times, and such an approach is stupid.

Last of all, to keep a language tool sharp and bright is like mastering a musical instrument—the most important thing is practice.

ASLIB MIDLANDS BRANCH CONFERENCE

Library Services as an Aid to Productivity

Birmingham, 12th December 1962

AS part of the programme for National Productivity Year, the Aslib Midlands Branch held a conference in Birmingham on 12th December, in collaboration with the Birmingham Productivity Association, the Library Association Birmingham and District Branch, and the Library Association Reference, Special and Information Section (West Midlands Group). The chairman was Mr R. R. Gilchrist, Works Director of Tubes Ltd, and the conference was held at the Birmingham and Midland Institute. Three papers were given, summaries of which are published in this issue. The full texts may be borrowed from Aslib Library.

REQUIREMENTS OF THE USER

PETER SPEAR, B.ENG.

Director of Research, Rubery Owen & Co. Ltd

SUMMARY

My remarks will be directed at those whose function it is to supply information. I myself am on the side of the minority in the audience concerned with production.

Who is the user? I suggest we employ the term 'production engineer', one who is fundamentally concerned with many aspects of widely differing technologies and sciences, which he blends together to form the production line.

Everyone in industry is of course concerned with productivity. These are your customers. I consider the size of the firm immaterial to the problem, the point being that problems may differ in size but never in principle. Basically, the user's problems are:

- to be able to pose his requirements;
- to be aware of the value of information;
- to get information in the right form at the right time, presented in the appropriate fashion.

People are often very diffident about admitting that they do not know, and need help; and their questions are posed in a complicated fashion. A craftsman is not necessarily a fool because he does not understand classification theory; a plant engineer is not necessarily an ignoramus because he does not know the difference between a librarian and a documentalist. Careful, co-operative and sympathetic questioning is often needed to elucidate inquiries. There is need for human understanding—room for the producer of information to 'sell' his wares. I sincerely believe that almost any form of selling is legitimate to make the production engineer aware of the value of information, and almost any form of encouragement which does not severely jeopardize the operation of the information service is justifiable.

It is an appalling fact that something like three million publications are produced every year, including patents, articles, books, and journals, and it is quite hopeless for even a specialist to hope to read and understand everything written within his field—much less is there any hope for the production engineer. But I do not think it can be rammed home hard enough that there is a wealth of information to be tapped and applied; so much that the amount of money wasted in duplicating, triplicating and even quadruplicating effort within the limited economy of the United Kingdom is a very frightening prospect. Our mythical production engineer needs so much information, but he needs it presented in the right form, with the minimum mass. It is extremely important that his information should be pre-digested or analysed.

I would not necessarily expect the library to answer everything, but I do expect it to be able to indicate the right sources. Often it is much more practical to give contacts, rather than a documented answer.

The idea of carrying out practical investigations, each aimed directly at solving an individual inquiry, is to me an ideal bridging of the gap between information services and general research and development programmes. Let us hope that other institutions will watch and be inspired by the progress of the large-scale industrial experiment of PERA (Production Engineering Research Association) with their Applications Research Laboratories, which are so closely integrated with their library, information and technical inquiry services.

I am not going to say much on the cost of information, but the library has a duty to teach people to use the services for which they pay. Most industrial organizations are members of a number of trade associations of one kind or another. Even small firms usually have one affiliation. Personally I believe that one can get ten times the value of a subscription in the sense that information might have cost ten times the amount if the resources of the research association had not been available.

We are constantly being urged to increase productivity by new ideas, new improvements, cheaper design of product, more functional design of product, better studies of the market, better plant, better techniques, and almost better everything. All this means more information, and it is the information worker's job to see it is available, and is made available and presented in the right form at the right time.

SERVICES PROVIDED BY BIRMINGHAM TECHNICAL LIBRARY

K. J. RIDER, F.L.A.
Librarian, Birmingham Technical Library

SUMMARY

Occasions which bring together both the providers and the users of a service to talk over their problems and needs are comparatively rare and are to be encouraged; one hopes they lead to greater understanding. Libraries must do their utmost to make their services well known in order to be of maximum use to the organization or community they serve; but only if their cries are heeded

will the marriage with industry take place, and be blessed with the inestimable benefit of higher productivity. A high proportion of the libraries serving industry form part of a firm or industrial group, a research or trade organization, to whose staffs or members they provide a direct service. These libraries, whose staffs work in close contact with their colleagues in workshops and laboratories, play a tremendous part in the dissemination of information throughout the country. Their work is dealt with by Mr Boodson in the following paper in this issue of *Aslib Proceedings*. Even today, however, the number of libraries in industry is small and a large collection of literature is beyond the means of many. The provision of a public technical library eliminates this difficulty. Birmingham Reference Library set up separate departments of commerce and technology soon after the First World War. From the outset there has been a need for collection of standard and major works likely to be in continuing demand—reference works, periodicals, treatises, and monographs, too expensive to be purchased by individuals or even the majority of firms. To these have been added a collection of the standard specifications of the main standardizing bodies and specialized agencies, and some foreign standards; also research reports and research journals and translations of foreign textbooks. A natural corollary is a collection of English-foreign technical translating dictionaries. In this brief account of the library's resources, I must also mention the collection of atomic literature, which is now one of the most comprehensive collections in the country. The Technical Library has also over a hundred of the leading indexing and abstracting publications—keys to the main fields of science and technology.

Equal in importance to the size and quality of the stock of the library is its exploitation. Inquiry work is one of the most important and constant duties undertaken by the staff, as well as guidance in the choice and use of publications, and suggestions for carrying out courses of study and literature searches.

Within the Birmingham area there is a valuable interchange scheme, with a union list of its participants' holdings, and this has been complemented by a works libraries loan scheme. Effective use of the Technical Library can help the inquirer to take advantage of new techniques, new products, and even new industries.

PRODUCTIVITY AND INFORMATION—LOCAL AND NATIONAL RESOURCES

K. BOODSON, A.L.A.

Librarian, Imperial Metal Industries (Kynoch) Ltd

SUMMARY

One of the difficulties about productivity is to know what it is, to know what we are talking about. It must have something more than the root dictionary definition of productive—'that produces an increase in wealth or value; that produces abundantly'. Merely to produce more is not enough for National Productivity Year purposes. The aim of the Year is to raise efficiency and lower costs; the Duke of Edinburgh, in the introductory address to *Aim for prosperity*,

says 'We can only compete with success if we can maintain a high standard of efficiency and productivity'. It is this combination of productivity with efficiency that is vital, and it is here that the triple partnership of research, development and information must be strongest.

In but one period of our history, the first half of the nineteenth century, have we prospered solely or largely on the basis of indigenous raw material. Then the availability of cheap, high-quality coal, coupled with a characteristic national inventiveness, led to a period of high prosperity. Changes in world power resources and the development of new technologies have reduced the importance of the one and accentuated the other. Our national prosperity and well-being must now depend on manufacturing ingenuity and efficiency, on research and innovation, advances in scientific technology, and the prompt development and application of ideas.

Behind all is the effective use of knowledge and information. Certainly in the output of technical literature there is no question of lagging productivity. The total number of scientific and engineering periodicals currently produced in the English language is estimated at eleven thousand a year, containing annually a total of 1,500,000 articles. A growing appreciation of the problems in dealing with information on this scale has led to the development, largely in the last three or four decades, of libraries and information units specially designed to work with and assist industry. I would like firstly to outline what services an industrial library can provide, and then to describe briefly what other information facilities are available to industry, from local and from national resources.

In ICI, and I speak as one of the family although only a sort of second cousin, research and information have always been an integral part of our organizational life. We have been pioneers in the field of industrial libraries and special library techniques, and have come to accept the library as a unit of company structure, as fundamental to its needs as the accountancy department, sales offices, and so on. Not all ICI libraries are extended units serving major organizations; there are in fact many 'one-man-bands' serving individual works, either on their own or as branches of a larger library. There is, of course, a level of organizational activity below which it becomes uneconomic to run an independent library. This is a complex matter, but a useful guide to some of the problems involved has recently been published by the Organization for Economic Co-operation and Development, under the title *Does your firm need its own information service?* This was the result of an inquiry undertaken by Aslib on behalf of OECD, to provide data on how the smaller firm could benefit from the use of technical information, and followed a convention held in 1961 on the subject of Technical Information for the Smaller Firm. The report is intended for firms with less than about one hundred professionally qualified staff. The activities discussed are those which could be inaugurated by one person, chiefly the exploitation of journals and books on a small scale. Details are included on the use of information extracted from publications, the advantages of a central information service to do this, the assessment and measurement of information work routines, the costing of information services, and factors in the selection of suitable staff for industrial libraries. One of the appendices gives examples of

the positive benefits of an information service and the negative results of lack of information.

One point in the report I would like to emphasize. It is often stated that necessary facts and knowledge—of competitors' activities, of market changes, of new materials and techniques—will find their way into the company organization casually and without directed effort. The report suggests that this can be satisfactory only in static conditions, which are in fact rare. More commonly, if the firm is to prosper it must be alert to changing conditions, informed without delay of technical and commercial developments. This is the very essence of information for productivity.

No two industrial libraries are the same. Their size and the duties they undertake are related to the complexity of their parent concern, and they have in common only the fact that they can never do all that is desirable. That is to give the concern the whole information it needs; to acquire facts of value and to present them to the right section in the company's organization; to keep abreast of changing conditions as they affect the company's interests, and for this purpose to maintain personal contact with users of information; finally to keep records as an effective means of supporting these functions.

The extent of their services will be dependent on staffs and budgets. But at the most optimistic no single library can, in the modern technological climate, cater for the full needs of its customers, nor would it be economical to do so. What the librarian must do is to get to know what specialized resources are available to him and to industry. Locally, we must consider the vast resources of the Birmingham Reference Library, the University Libraries, those of the College of Advanced Technology, and other specialized colleges in the city. It will be convenient at this stage to mention a pamphlet entitled *Library resources in the West Midlands*, published in 1958 by a local group of the Library Association. This listed 176 libraries in the five Midland Counties, 29 per cent public libraries, 21 per cent the libraries of academic and educational institutions, 25 per cent those of industrial concerns, and 25 per cent other libraries, those of societies and religious bodies, private libraries and miscellaneous. The document records the organizational details, resources and activities of each library, and the degree to which its services are available externally. It gives a full picture of the variety and extent of organized library facilities in the area, and enables me to concentrate on certain units providing a direct service to industry, or holding special resources. These include the Birmingham Chamber of Commerce, the Birmingham Engineering and Building Centre, and a variety of information units with resources and experience in specific fields.

At the national level, information for productivity, and information services to industry, are more closely tied to research, and the benefits which industry generally can derive from the country's research activities are well established. These research activities fall into the following groups: Government departments and statutory organizations; DSIR grant-aided research associations; societies and institutes; universities and technical colleges; development and trade associations; industrial organizations and concerns; independent sponsored research institutes. In some of these, results of the research work are freely available, in others it is made available only to supporting members, or

internally; in certain cases part of the work is restricted, part published. For details of individual organizations, I would refer you to *Industrial research in Britain*, edited by A. W. Haslett, in the 4th edition published this year by Harrap Research Publications. I cannot do better in the time available, than to suggest that work as a guide to what is being done and what research organizations there are in the country as a whole, at the same time emphasizing the activities of the Department of Scientific and Industrial Research.

One can mention only very sketchily the resources of the national collections and of the universities and the learned societies. Although I have continually laid stress on information available directly to industry, it is no solution to the problem of productivity and information to leave the industrialist to 'go it alone'. Effective use of information cannot be achieved on a do-it-yourself basis. It has become a complex involved business requiring special techniques and experiences. Let us hope that this meeting has shown how we might work together, representatives of industry and of the information world, to make a lasting impression on national prosperity that will continue beyond and after National Productivity Year.

CAN 'THE LITERATURE' BE READABLE?

MAGNUS PYKE, B.Sc., PH.D., F.R.I.C., F.R.S.E.

Glenochil Research Station, The Distillers Co. Ltd

Aslib Scottish Branch Conference, Edinburgh, 22nd February 1963

LITERATURE, in the ordinary sense of the word, is the written record of something worth saying, well said. In the special sense in which it is now used, 'the literature' is everything that is published by scientists and about science. It includes weighty and scholarly monographs and textbooks, long and detailed reports of researches occupying half the lifetime of a man, substantial contributions by teams of workers announcing discoveries of first-rate importance—and short notes of detailed observations, descriptions of new apparatus, fresh techniques, the use of a new reagent, sometimes merely the use of an old reagent but differently applied. The literature includes as well secondary literature, reviews of papers already published, lists of titles, abstracts, translations, patents. There is even a tertiary literature comprising reviews of topics already covered by other reviews and collections of abstracts. And as the backbone of the tertiary literature we always have the steady output of textbooks and handbooks, of published symposia and colloquia containing articles which are themselves reviews of abstracts of the primary literature in which the actual scientific facts are reported.

We do not need to be surprised at so much publication. Science is one of the great driving philosophies of our modern world, and every industrial country—our own among the rest—is consciously taking steps to increase the number of its scientists. These people, the scientists, do not produce things. They do not themselves make plastics or petro-chemicals, cameras or computers; they do not in the real sense of the word manufacture transistor wireless sets, bottles of vitamin tablets or atomic power stations. Scientists make none of these things. What they produce are ideas. To be of use to medicine, industry, humanity, these ideas must be expressed in words or symbols, written down and published. It is all this, important, unimportant, trivial, exhaustive, clear, confused, correct or wrong that makes up 'the literature'. It is this that fills the fifty thousand scientific and technical journals that are today published each year, containing, according to an American report, 1,200,000 articles, from which come sixty thousand new scientific books and a hundred thousand research reports.

It cannot be expected that all of these publications will be easy to comprehend, but is it reasonable to hope that at least a core of this great mass of writing shall be readable?

On 19th October 1962, there appeared in the weekly journal *Science* a review written by Professor Ernst Mayr of a book, 724 pages long, by Carlton Coon. This book was called the *Origin of races*. In his review Professor Mayr wrote: 'The number of individual investigations that will have to be undertaken to test the correctness of Coon's inferences is legion. When a volume of such major scientific importance is at the same time highly readable, it is something for which to be truly thankful'. It is also, Professor Mayr clearly implies, something to excite surprise.

We have come to assume that the reason why so much of the literature is unreadable is because the matters with which it deals are abstruse, complicated and technical. We also tend to accept that this reason is a good one. I should like to suggest that it is no more valid for scientific writing than it is for the productions of those illiterate people who compose the obscure and ambiguous instruction manuals that are sent out with motor mowers, sectional greenhouses and portable typewriters. Certainly a man who wishes to understand a paper on the 'pentose-monophosphate cycle' must know some biochemistry, just as a man must understand music if he is to benefit from an article on the tonal qualities of the major compositions of Bela Bartok, but this does not excuse either article being obscurely written in jargon. The purpose of both is to convey thought and information from the mind of one man to that of another. My present thesis is that this, in science as in any other topic, is an art demanding some trouble, but one that can be mastered.

Let me outline some of the ways in which unreadability has through the years gradually overtaken the scientific literature.

When Newton wrote his work *Optiks* in 1704 he wrote in plain English. For example, he described his ideas about atomic structure like this:

'It seems probable to me', he wrote, 'that God in the beginning formed matter in solid, massy, hard, impenetrable, moveable particles; of such sizes and figures and with such other properties, and in such proportions to space, as most conduced for the end for which he formed them; and that these primitive particles being solids, are incomparably harder than any porous bodies compounded of them; even so very hard, as never to wear or break in pieces.'

Theoretical physicists do not write about atomic structure like that now. Now scientists attempt not to be elegant in the literary form they use, but to be neutral. And since, in writing, if one does not make an effort to express one's meaning *better*, it seems inevitable that one slides back (it does not seem possible to stay still), this has had a curious result, rather like that occurring for the same reason in legal writing and in the writings of public authorities. The sort of thing that happens is that the scientist begins to write 'affirm' or 'allege' or 'assert', or perhaps 'aver', 'claim', 'contend', 'declare', 'intimate', or 'state', when he means 'say'. Instead of 'much', he writes 'a considerable amount of' or perhaps 'a great deal of', 'a large quantity of' or even 'a major proportion of', and his prose is ornamented with such phrases as 'circular in outline', 'complex in character', 'large in size', 'next in order', and—most popular of all—'red in colour'. His meaning, however, is still apparent. The next stage is more

sinister. He finds that special words properly constructed either on a classical basis or otherwise, and consequently still intelligible, are useful. This is, of course, to be expected. If an ultimate particle of matter is to be a unit of negative electricity it is not unreasonable to call it an 'electron'. And when an exceptional particle is discovered which is a positive unit of electricity instead of a negative one it is perhaps excusable to dub it a 'positron'.

These words are of practical utility and it is no more unreasonable to expect people who take an interest in science to understand what they mean than it is to expect educated men and women interested in the structure of the English language to understand what a gerund is. But where the scientist begins to head for confusion is when, like Humpty Dumpty, he takes perfectly ordinary words and tries to make them mean not what he has been taught at school they *do* mean but what he *wants* them to mean. The chemist wants 'precision' and 'accuracy' to mean special and different things. For example, 'precision' is to mean that every time he does an experiment he gets the same result, while 'accuracy' implies that the result is right. The dictionary makes no such distinction. The physicist says 'hot' not when he means hot but when he means radioactive; and he is aggrieved at not being understood. Soon, by imperceptible steps, the stage is reached when one kind of scientist uses a word to mean one thing and another kind of scientist uses the same word to mean something quite different. For example, to a biologist 'plasma' is the liquid in which the blood corpuscles are suspended; but to a physicist 'plasma' is electrified gas. And so the different kinds of scientists grow away from each other just like prehistoric tribes which once shared the same grunts and clicks but which, as the areas they occupy separate, do so no longer.

But even the members of a *single* scientific tribe are not immune from the pervasive spread of incomprehension. Their danger arises from the fog and confusion of plethora. There is too much published and the pebbles of information are lost in the shingle. Printing came late in human progress. Before then, the savant's problem was to discover a source of knowledge. His difficulty was the long and hazardous journey to Alexandria to find the sage who could teach him or the book in which the wisdom lay. Printing was a long time coming; but now it has started, like the Sorcerer's Apprentice, there is no stopping it.

The publication of printed 'communications', as they are called, is today an accepted feature of scientific lifemanship. Since the number of practising scientists is constantly growing, the volume of the so-called scientific 'literature' has become immense. It follows, therefore, that no one man can hope to read it all, he cannot even hope to read everything concerning his own speciality, and since it is an accepted custom when writing a paper to refer to a dozen or so other papers where the details and descriptions of what you are talking about are to be found it is not surprising that incomprehensibility rises up like a fog.

It must not be thought, however, that scientists allow themselves to be stifled without a struggle. Nobody likes to see the value of money fall, although we would all like, ourselves, to receive more pay. In the same way it would be asking too much to expect the ambitious young scientist to forbear to publish or, when he does publish, to write in anything other than the accepted private

language of science. But when things become too confused some measure of help is at hand.

Less than twenty years ago it was found that penicillin could be manufactured wholesale by putting the appropriate microbe, *Penicillium notatum*, into a tank and agitating and aerating it in a more or less controlled fashion. This was the beginning of what has since grown into a large and important branch of applied science now called 'industrial microbiology'. The development of this field of science has been accompanied by the emergence of its own specialized literature. And already the industrial microbiologists, besides having lost touch with most other biologists, are losing touch with each other in an embarrassment of published words. Like members of other and older specialties before them the industrial microbiologists are showing their advancing sophistication by throwing off a number of new breeds of scientific communicators. There are the 'symposiasts' who edit great books called, say, *Perspectives in biology and medicine*; there are the 'advancists' who bring out *Advances in applied microbiology*, and there are the 'progressivists' who father such volumes as *Progress in industrial microbiology*.

It will be remembered that the first essential feature of science is the collection and recording of facts, preferably in quantitative terms. And this is where the scientists with their lack of literary background have gone wrong. They have not appreciated how difficult it is to record facts in writing. Having made an observation or done an experiment they have simply sat down and written a full memorandum and then, more often than not, published it. Now the heart of the matter is that it is very difficult to nail down the essential features of a fact in writing. Among all those 1,200,000 significant scientific articles that are published each year, let us imagine one written by an epidemiologist about the pathology of a particular type of bacillus and its correlation with military sickness rates and active service conditions in the Middle East. In its usual form, this paper will comprise an introduction; description of investigational methods employed; account of the organism, its morphology, natural history and habit of growth; tables and charts showing the incidence of ill health, prognosis, treatment and mortality; and a final section of conclusions, recommendations, acknowledgments and references. The whole document will probably occupy ten pages of small print. But here is another way of recording the same facts:

'And it came to pass that night, that the angel of the Lord went out, and smote in the camp of the Assyrians an hundred fourscore and five thousand; and when they arose early in the morning, behold, they were all dead corpses. So Sennacherib king of Assyria departed, and went and returned, and dwelt in Ninevah.'

Clearly, this prose style, regardless of its impact on the mind, is not suitable or adequate for the description of scientific observations. It is necessary in science for a great deal of technical material to be recorded and for figures and graphs of all sorts to appear. Much of science may, indeed, be better expounded in terms other than language. Mathematics, for example, is a means of expressing thoughts and ideas in terms other than words.

It is interesting to consider how a scientific idea, just like an idea in any other branch of human endeavour, may be discouraged and frustrated by its discoverer's inability to disseminate it. The most famous example is perhaps Gregor Mendel's ideas about genetic inheritance. Mendel spent twelve years in experimenting with peas and following the transmission of different characteristics from one generation to the next. From the results of this work he produced an idea: that the number of different types of plants produced by hybridization appeared in certain constant numerical ratios one to another. Eventually, when he had verified this remarkable discovery to his satisfaction, he published his conclusions as a journal issued by the Brünn Society for the Study of Natural History in 1866. And there the discovery lay hidden and lost as if it had never been made for thirty-five years—a generation!

It is interesting to speculate why the report of Mendel's immensely significant discovery, which could have revolutionized current ideas on heredity, failed to penetrate into the scientific thinking of his times. The *Proceedings* of the Brünn Society were, as was customary, distributed to the main centres of scientific activity such as Vienna, Berlin, London and Rome. Possibly they were overlooked because the way in which the combination of mathematics and botany was set out obscured the meaning which Mendel intended to convey. The facts were all there, the discovery was made, and in 1900 the Dutch botanist, De Vries, gave Mendel full credit for his insight at a meeting of the German Botanical Society in which he described further experiments which substantiated Mendel's hypothesis. But nevertheless the publication in 1866 had failed in its purpose.

An example at the opposite extreme, also from the science of biology, is that of Darwin and Wallace. Both these men hit on the theory which is now accepted as the principle of evolution. Today, however, the discovery is indissolubly linked to the name of Darwin, partly because of his scientific genius and the remarkable observations which he collected in his work, but partly also because of his literary facility, his ability to make scientific literature, for example the *Origin of species* which quickly became a best seller, literature in the real sense of the word.

With the existence of the present elaborate system of abstracting and codifying everything that is published in the scientific literature, it *ought* to be possible for a man to be aware of every piece of knowledge that is published in his field. But while this is theoretically possible it may not always happen in practice. The problem that the scientist faces in writing for publication is, in essentials, the same as that with which an historian, a lawyer or even a novelist has to cope. This is to communicate an idea. To do this effectively, what is written must not only contain the facts but it must be readable. This means more than mere legibility. Something that is readable must make an impact. It is assumed that science is a perfect democracy in which every worker is equal to every other and that when an observation is reported it will receive as much attention whether its author's name is Johnson or Hopkins. In fact, this is not so. A report of the chemistry of an obscure sulphur-containing dipeptide isolated from muscle can easily be overlooked—particularly if it is badly written in unreadable prose—if it is published by Johnson, of whom nobody has ever heard, whereas it will

justifiably make a stir if the author writes well and has done so for twenty-five years and bears the honourable name not only of Hopkins but of Frederick Gowland Hopkins, F.R.S. It is true that the unknown Johnson may have the seeds of greatness in him and may have made a very important discovery, but we have already noted what happened to the writing—unluckily unread—of an equally unknown Gregor Mendel.

There are some signs that after a long period of dark and rigid formalism, editors of scientific journals are at last experiencing the dawn of enlightenment. For many years scientific editors insisted on the use of the passive voice, on precise conformity to a Draconian system of style and layout, to transgress which by a fraction was to bring down certain insistence on revision and compression. The instructions to contributors, admirable as they may have been in intention, did not conduce to readability. Here is an example:

'The test was made immediately after *the subjects* had consumed meals, the solids portions of which varied from 6 to 18 oz. From the result *it was found that* the effect of size of meal on number of words typed was *highly significant*, the typist working best after meals, the portions of which weighed 9 to 12 oz. However, in further tests *it was found that* the effect of size of meal was rendered *insignificant* if *motivation* to do well was sufficiently great.'

In other words, the scientific nutrition of one's typist helps her with her work—unless it doesn't.

In October 1962, *Science*, the weekly journal of the American Association for the Advancement of Science, published fresh instructions for contributors. In years to come we may, I hope, recognize that these instructions represent a milestone in the interpretation of science, that is in the vital function of how the ideas derived by scientists from their observations and experiments—the essential commodity of scientific endeavour—can be made negotiable.

'Make sure that the significance of your work will be apparent to readers outside your field', say the editors of *Science*. Now *Science* is a general journal which publishes articles about chemistry, biology and physics indiscriminately. The advice of its editors on this point, however, could usefully be copied by the editors of journals that *are* restricted to chemistry, or some aspect of biology, or to physics, or to some applied topic such as electronics or radio-chemistry. As the mass of knowledge grows, people working on an experimental problem can only be fully expert in a limited field. Because of this, however, their need to understand what is going on outside their immediate speciality becomes greater rather than less and it is, therefore, just as necessary today for a radio-chemist to report his results so that they are comprehensible to a biochemist as it is to make them understandable to other radio-chemists.

'Avoid specialized laboratory jargon and abbreviations,' wrote the editors of *Science*, 'but use technical terms as necessary, defining those likely to be known only in your field. Readers will skip a paper they do not understand. They should not be expected to consult a technical dictionary.'

The organic chemists, let us say, may object that for them there is no need for such time-wasting literary graces as the avoidance of jargon or the need to be comprehensible to anyone besides another organic chemist. They may even say

that nowadays the essential facts in their reports will be automatically abstracted on a punched card and safely imprinted on the memory of a computer. This may often be true, but not always. Professor Bernal has described a war-time conference on information retrieval at which the proponents of punched cards argued the virtues of Hollerith indexing with the supporters of computers, and both were in acute disagreement with the man who proposed to use microfilm. At the end of a long meeting an old, old librarian from the Admiralty expressed *his* opinion. It was that the best machine he knew for finding a particular piece of knowledge was a human head. His experience had shown, he said, that all the useful information on any chosen topic could be supplied by about six people if one only knew which ones to ask.

Please do not think that I would for a moment belittle the usefulness and power of computers, indexes and systems of mechanical retrieval, ranging from knitting needles to magnetized tape. At the same time, it is human heads that have to decide what information to seek. And if this information has been conveyed in clear readable form in the first place, its chance of being used must be increased. No matter how specialized the scientist's field may be nor how narrowly technical the journal in which it is published, surely the advice of the *Science* editors is valid. Let me quote one more passage, the most revolutionary:

'Choose the active voice more often than you choose the passive, for the passive voice usually requires more words and often obscures the agent of action. Use the first person, not third; do not use the first person plural when the singular is appropriate.'

This is brave stuff and there is more of the same sort. The pompous, passive voice, the third person and the bogus 'we' having been stripped away, the *Science* editors boldly stamp on the equally deplorable practice of referring to unpublished work and so-called private communications.

The question that I have been discussing is, can 'the literature' be readable. The answer I should like to give is 'yes'. Newton was readable and so was Darwin. To read either, one must first of all know English—or, for some of Newton, Latin. To understand Newton, one must know enough mathematics. To follow Darwin demands some knowledge of zoology and palaeontology. And similarly to build on the current scientific literature one must be literate in science. The editors of the journal *Science* have shown courage in stripping the cotton wool of the accepted stilted literary form from their contributors. Other editors must now show equal courage and self-restraint in the more specialized and technical fields of science by resisting triviality. If they too demand that their contributors say clearly what it is they are describing, the separate publication of tiny bits of new knowledge piece by piece, with which the literature is nowadays cluttered up, will be seen for what it is. And then it may not be too optimistic to hope that discoverers reporting larger and more complete pieces of new knowledge will come to appreciate that to convey an idea, no matter how concrete and technically precise may be the observations upon which it is based, requires a nice use of words if thought is to be communicated from one man's mind to another. Even if the scientific literature does not achieve fully the status of literature it will then, we can hope, at least be readable.

Letter to the Editor

MONITORING CURRENT TECHNICAL INFORMATION

Dear Madam,

As editor of the ANBAR Documentation Service on Office Organization, Management and Methods, may I be permitted a few brief comments on Mr Coates' most interesting paper published in the December issue of *Aslib Proceedings*?*

We commenced publication only a few months before the *British Technology Index*; we have experienced a similar range of problems and have in many (but not in all) cases come to similar conclusions; and we are not, of course, competitors of BTI as our fields of coverage do not to any material extent overlap.

I. We did not come to the conclusion that 'a world-wide index is simply not in sight at present' but rather that in attempting world-wide coverage certain limitations must be accepted:

1. Whilst coverage of UK publications can aim at being comprehensive, overseas coverage must—and should—be selective.
2. Promptness in publishing entries is vital but the time span commences with the effective date, i.e. the date of arrival in the UK.

As the result of these considerations we have included the leading specialized publications of fifteen overseas countries.

II. We did not come to the conclusion that certain formal categories of material can be excluded on the basis of 'statistically valid' criteria, such as the length of the contribution or the form in which the contribution appears (e.g. letters to the editor).

Our principles are—on paper—more complicated but have worked well in practice. They are:

1. Full-length articles are included *unless* we consider them completely useless.
2. Briefer items are included *if* we consider them of reference value.

III. Speed of publication. We gave a great deal of thought to this and came to the conclusion that—important as it is—it cannot be considered in isolation. We do quite a number of things BTI do not do:

1. We publish abstracts of all major contributions. (The term 'major' refers to value, not to length.)
2. In a supplement to the abstracts, we draw attention to what we consider the most valuable contributions.
3. *Each* issue of our index is cumulative; in respect of each abstracted item the reference is to the abstract.
4. Our index is classified under approximately 250 headings.

* Coates, E. J. Monitoring current technical information with the British Technology Index. *Aslib Proceedings*, vol. 14, no. 12, December 1962, p. 426-37.

We are therefore, by Mr Coates' definition, more effective for two purposes:

1. For 'keeping tabs on' or 'monitoring' what is currently going on in our field (p. 434).
2. For browsing and collective field surveys (p. 433).

We do not think, and we have not had it suggested to us, that we are therefore producing an index that is unsuitable for the needs of the user who is interested in a narrow field or in answers to a specific problem.

If the classification is good and clearly signposted by an alphabetical key which includes synonyms (as ours does) and tables showing the logical construction, the index can be effective for these purposes also. We do not therefore think that it is unavoidable to 'fall between two stools', but we would welcome discussion on this point.

But to return to speed. How long does it take us to do it our way? The table below gives the answer:

<i>From date of publication to*</i>	<i>Minimum</i>	<i>Average</i>	<i>Maximum</i>
publication of abstract	6 weeks	8 weeks	10 weeks
publication of index	8 weeks	12 weeks	15 weeks

* For UK publications; for overseas publications add four weeks or actual transmission time to UK, whichever is the longer.

There is, in our opinion, a right and a wrong reaction to these times. The wrong reaction is to emphasize the theoretical maximum of fifteen weeks for the index. The right reaction, we believe, is that retrieval is perfectly feasible once the abstract has been published. The search of one volume (one year) will involve *one* index and one or two issues of the abstracts, an average of two and a half issues. Even when allowance is made for the fact that searching abstracts takes longer than consulting an index, the task should take no longer than consulting an average of six issues of a non-cumulative index.

IV. Mr Coates has given us food for a lot of thought and we are most grateful to him.

Nothing I have written is intended as a criticism of BTI. On all the points I have raised his conclusions may well be right and ours wrong.

What would, therefore, be so welcome and so valuable is users' views on these points. There is no doubt that most of your readers, Madam, are vitally interested in the assistance good abstracting and/or indexing services can give them. They, in turn, can contribute substantially to the development of such services by joining in a discussion of the problems editors are faced with.

Yours faithfully,

H. P. CEMACH,
Director

Anbar Publications Ltd,
34 The Mall, Ealing, London W5
21st January 1963

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 5 Stratton Close, Hounslow. Hounslow 6954.

TRANSLATIONS, TECHNICAL, SCIENTIFIC, all languages, by specialists with sound technical and scientific qualifications. J. Smuts, BSC(ENG), FIL, 12 Thorndene Avenue, London N11. Stamford Hill 8564.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Roumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

Appointments vacant

RESEARCH ASSOCIATION OF BRITISH FLOUR-MILLERS. LIBRARIAN required for small scientific library. Must have science degree and a working knowledge of German and French would be an advantage. Salary (carrying FSSU) dependent on experience. Apply Director of Research, Cereals Research Station, Old London Road, St Albans.

BRIGHTON EDUCATION COMMITTEE. Brighton Technical College. Required from September 1963: ASSISTANT LECTURER Grade 'B' for librarianship. Full details of the post (including salary scales) together with application forms, from the Principal, Brighton Technical College, Coombe Road, Brighton 7, to whom they should be returned by 1st April.

DSIR NATIONAL ENGINEERING LABORATORY, East Kilbride, Glasgow, requires an EXPERIMENTAL OFFICER or ASSISTANT EXPERIMENTAL OFFICER, as assistant to the head of the library. Qualifications: GCE two 'A' levels in maths or science or equivalent. Over 22 degree or Higher National Certificate in appropriate subjects. Should preferably have passed the Registration Examination of the Library Association. Experience in a technical library and knowledge of foreign languages would be an advantage. Salary: Experimental Officer £1,130-£1,389. Assistant Experimental

Officer £476 at 18, £671 at 22, £833 at 26 or over rising to £1,022. Housing available in approved cases. Application forms obtainable from the Director at the above address. Closing date 29th April 1963.

Appointment wanted

PHYSICIAN with British and German degrees practising in London, has worked clinically and scientifically in Germany and Britain, wishes extension of activity. Fluent English and German. Medical or scientific translations, editing, editorial or industrial advice. Box 263, Aslib.

For sale

ENCYCLOPEDIA BRITANNICA, 1929 ed. in standard case. Offers to Mrs J.M. Vincent, 80 Woodward Road, SE22, or phone TOW 3839 after 7 p.m.

LIBRARIAN/INFORMATION OFFICER

Applications are invited for the post of Librarian/Information Officer at the Staff College of the National Coal Board. The work is concerned with operating a small library and developing an information service in the management field. Applicants, who may be either men or women, should be chartered librarians (Library Association) or people about to qualify. They must have had some experience of library work, although not necessarily in a specialist field. Starting salary will depend on qualifications and experience, but will be within a scale £650-£800 a year. Applications should be addressed to the Principal, Staff College, NATIONAL COAL BOARD, Chalfont St Giles, Bucks.

Aslib Proceedings

incorporating Aslib Information

Machines that Interact with Men

GORDON PASK

The Testing of Index Language Devices

CYRIL W. CLEVERDON AND J. MILLS

ASLIB • 3 BELGRAVE SQUARE • LONDON SW1

Aslib Proc
30 MAY 1963

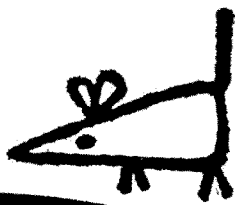
vol.15 no.4 p.97-134

London, April 1963

HOW TO GROW BIG AND STAY SMALL

Once there was a whale. And his eyes had grown so big, they could only focus on huge things — like himself. There are whales among bookshops, too. And sometimes their eyes have grown big. But sometimes if their name is BLACKWELL that part of them has stayed small. Small and piercing and *careful*. Just because they are, unquestionably, a whale — covering 41,455 square feet of bookshop, employing 409 people, filling anything up to 6,240 orders a week, and keeping so many books in stock, they never have time to count them — AT BLACKWELL'S they take extra care to see the smallest details. Every order, however big, however tiny, must be treated like an *individual* and given all the time it needs rather than all the time it's worth. That's the principle OF BLACKWELL'S. Quite deliberately, they work to combine the power of a big brain with the exactness of a small eye. SO IF THERE IS ANYTHING, BIG OR SMALL, YOU'D LIKE TO DISCUSS — RING OXFORD 491111. JULIAN BLACKWELL AWAITS YOUR CALL WITH NARROWED EYES.

BLACKWELL'S BROAD STREET OXFORD



ASLIB PROCEEDINGS

incorporating Aslib Information



Volume 15

April 1963

Number 4

ASLIB CALENDAR 1963

April

- TUE.23. Midlands Branch meeting at Coventry. See paragraph below.
TUE.23. Textile Group annual general meeting at Nottingham, 11 a.m.
TUE.23 - FRI.26. Junior introductory course to special library and information work.
WED.24. Evening meeting at Aslib, 5 for 5.30 p.m. 'Interviewing', by O. J. Whitley.
THUR.25 - SAT.27. Northern Branch Conference at Harrogate.

May

- WED.1. Scottish Branch visit to British Hydrocarbon Chemicals Ltd.
FRI.3. Biological Group preliminary meeting at Aslib, 2.30 p.m. See paragraph below.
TUE.7. 'Information on a shoestring' course for part-time information workers, in Nottingham.
THUR.9. Fuel and Power Group annual general meeting at Aslib, 2.30 p.m.
THUR.16. Technical Translation Group meeting at Aslib, 3.30 for 4 p.m. 'The new Tower of Babel', by Professor R. O. Kapp.
TUE.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'From Patent Office Library to National Reference Library of Science and Invention', by Miss M. Webb. See paragraph below.
WED.22 - THUR.23. 'Crossing the frontiers', course on the acquisition of literature from overseas. See paragraph below.

June

- TUE.11. Annual General Meeting at Aslib, 12 noon. See paragraph below.
FRI.14 - SUN.16. Electronics Group annual conference at Ashridge College.
TUE.18 - FRI.21. Course on film librarianship. See paragraph below.

September

- TUE.24 - THUR.26. 37th Annual Conference at St Andrews. See paragraph below.

Sir Harry Lindsay, K.C.I.E., C.B.E.

Members of Aslib will have learned with regret of the death of Sir Harry Lindsay in March, at the age of eighty-one. He had been closely connected with Aslib both as President of the Association of Special Libraries and Information Bureaux in 1938, and later as Vice-President of Aslib during the years of rapid post-war expansion, 1949-51. He addressed the 14th Conference in 1937 at Cambridge on 'The inter-relation of science, agriculture, and industry', and gave the Presidential address at the 16th Conference in 1939 at Nottingham on 'The Imperial Institute as an information centre'. Both papers were published in the reports of the proceedings of the two conferences.

Annual General Meeting, 1963

The Annual General Meeting of Aslib will be held at 12 noon on Tuesday 11th June 1963, at 3 Belgrave Square, London, SW1. Papers will be despatched to members in due course. The meeting will be followed by a buffet lunch, price 15s a head, and it is hoped that members will take the opportunity of visiting the various service departments of Aslib and of meeting members of the staff.

Evening Meeting

The speaker at the evening meeting on Tuesday 21st May at 3 Belgrave Square, will be Miss M. F. Webb, B.Sc., A.L.A., Head of the Patent Office Library, and the title of her paper will be 'From Patent Office Library to National Reference Library of Science and Invention: a progress report'. Miss Webb will discuss three main streams of work involved in setting up the National Reference Library of Science and Invention—activities within the Patent Office Library, those within the British Museum, and the general progress of the building plans.

The meeting will be held at 5.30 p.m. and tea will be at 5 p.m. An application form is enclosed with this issue of *Aslib Proceedings* and members wishing to attend are asked to fill in the form and return to Aslib not later than 7th May.

Crossing the Frontiers

Recent developments have directed the attention of special librarians and information officers to parts of the world in which they once had little interest. Important scientific research is being carried out in countries which formerly contributed little to scientific knowledge, and formerly undeveloped countries have become important as markets or as competitors. But librarians and others trying to obtain publications from these countries are often frustrated, not only by language difficulties, but also by lack of knowledge of the organization of publishing and the book trade in the countries concerned, and of the psychology and business practices of their inhabitants. To help members who find themselves in this position, Aslib has organized a course at which a number of librarians with considerable experience of obtaining publications from distant countries will talk about the problems involved in both finding out what has

been published in the countries of the Soviet bloc, the Far East, and Latin America, and in obtaining publications from these countries. There will be a special session on obtaining foreign government publications, and another in which booksellers will advise librarians on how to ensure the best service when trying to get publications from overseas through the trade. The course will be held at Aslib on Wednesday and Thursday 22nd and 23rd May, and the fee will be 6 guineas. A full programme is enclosed in this issue, and applications to attend should be made on the form included in it.

Course on Film Librarianship

The film has become an important means of recording and communicating information and, in addition to the growing number of film libraries, there are many other special libraries that hold films for the use of their readers. The care and handling of film demands special knowledge and skills which have not been covered by the courses available up till now. Owing to the co-operation of the Film Production Librarians' Group, Aslib is able to offer a course on film librarianship to be held at 3 Belgrave Square, from Tuesday 18th June to Friday 21st June. The course will consist of lectures on all aspects of film library work and visits to a wide variety of film libraries. It is intended to be useful not only to those working in film libraries, but also to librarians in other types of libraries who administer collections of films. The fee for the course will be 10 guineas, which includes transport for some of the visits involving coach trips. A full programme is enclosed in this issue, and applications should be made to the Education Officer, Aslib, on the form contained in it. As the number of places on the course is limited, intending students are advised to book early; provisional bookings by telephone or telex will be accepted.

37th Annual Conference

All members should have received (in the March issue of *Aslib Proceedings*) an advance programme and application form for this year's conference at St Andrews from 24th-26th September. Any members who did not are advised to apply for one without delay, because the closing date for applications is 31st May. This early date has been chosen in the hope that Aslib may be able to help with members' travel arrangements. London members will probably wish to travel overnight, or by the 10 a.m. from King's Cross on the day before the conference. In either case, it may be desirable to ask British Railways to provide additional accommodation, and for motor coaches to meet some trains. For members coming from the Midlands, Lancashire, or Yorkshire, who may find it easy to reach Edinburgh, some special arrangements for onward transport to St Andrews may be helpful. Aslib cannot help unless all members notify their precise travel plans for both outward and return journeys by 31st May.

Midlands Branch

A joint meeting of the Midlands Branch and the Coventry and District Information Group will be held in Coventry on 23rd April. The programme includes a tour of Coventry Cathedral, a session at Lanchester College of

Technology when Mr A. Harden and Mr D. Parish will give a paper on the 'Assessment of information system requirements', and, at 2 p.m., a visit to the Training Centre of Massey Ferguson (UK) Limited at Stoneleigh. Further details may be obtained from the Hon. Secretary of the Branch, Mr J. H. Seals, The Library, College of Advanced Technology, Gosta Green, Birmingham 4.

Biological Group

It has been suggested that, subject to the approval of the Council, a Biological Group of Aslib be formed. There would appear to be considerable support for this idea so that a preliminary meeting has been arranged for Friday 3rd May at 2.30 p.m., in the Council Room at Aslib. It is hoped that those members who are interested will endeavour to attend this meeting. Those who intend to be present and have not already written are invited to inform Miss P. L. Edwards, Department of Botany, British Museum (Natural History), Cromwell Road, London SW7. Comments and suggestions from those unable to be present would be welcomed.

Commercial Information for Management

This will be the theme of a seminar arranged by the British Institute of Management. It follows up a recent BIM survey of the collection and communication within companies of commercial (i.e. managerial, political, economic, and industrial) information of the kind obtained mainly though not exclusively from published sources. The seminar will take place on Thursday 23rd May from 2 p.m. to 5 p.m. at Management House, 80 Fetter Lane, London EC4. It will be led by Mr E. H. E. Jones, Head of the Central Information Services at Shell International Petroleum Company Limited and Chairman of the BIM Library Advisory Panel. The fee will be four guineas for members of the British Institute of Management and representatives of member companies, and five guineas for non-members. Further details may be obtained from the Conference Secretary, BIM, at the address given above.

New Courses in Information Science

The Northampton College of Advanced Technology, London, in collaboration with the Institute of Information Scientists, has already held two series of evening courses in scientific information work, in which valuable experience has been gained. The courses are now to be continued and extended in the forthcoming academic years, starting at the end of September 1963.

Two courses will be held: *a*, a full-time Diploma course of one academic year, in 1963-4 and onwards; *b*, a part-time evening course (two evenings a week, 6.30-8.30 p.m., during term time) over two years.

These are post-graduate courses for those about to become information scientists and for those who have already started in information work. Their purpose is to provide comprehensive training in this important field of activity, and to establish professional standards which employers will find useful in the

selection of suitable staff. The full day course will provide adequate practical work, including a period to be run as a model information department. There may also be opportunities to participate in research on information retrieval. Students attending the evening course will be expected to undertake some practical work outside class time.

The full course will also include study of a foreign language. Examinations for the College's Diploma in Information Science, will be held at the end of the full-time course. External examinations for the Certificate of the Institute of Information Scientists will be held in two parts, one at the end of each year of the part-time course. The standards required for the Diploma and Certificate will be the same.

The Course organizers, lecturers and tutors include Mr J. Farradane, B.Sc., A.R.C.S., A.R.I.C., F.I.INF.SC.; Mr A. Gordon Foster, F.I.INF.SC.; Mr C. W. Hanson, B.Sc., F.I.INF.SC.; and Mr F. Liebesny, B.Sc., A.L.A., F.I.INF.SC., F.I.L.

Fees will be £60 for the full course, and £30 for the two-year evening course. Applications should be sent to the Northampton College of Advanced Technology, St John Street, London EC1. Details of the syllabus and information concerning the Certificate may be obtained from Mr J. Farradane, Hon. Secretary of the Institute of Information Scientists, Ltd, Torran, Crofton Road, Orpington, Kent.

New American Degree Course

A new curriculum in information science leading to the degree of master of science (information science) will be inaugurated in the spring (April) term at the Graduate School of Library Science, Drexel Institute of Technology, Philadelphia. This will be the first curriculum of its kind in the United States.

The subjects will include instrumentation and computers, science bibliography, publication, management, and science. Research will be an important part of the student's work and a thesis will be required. Students will be given practical experience in information centres. Information about the course may be obtained from Mrs Beatrice Davis, Director of Students, Graduate School of Library Science, Drexel Institute of Technology, Philadelphia 4, Pennsylvania, USA.

Scottish Library Association Summer School

This year's summer school of the Scottish Library Association will be held at Newbattle Abbey, near Dalkeith, from Saturday 29th June to Friday 5th July. The sessions will provide lectures and study projects on a wide range of subjects: and the lecturers will include Mr F. C. Hirst, Librarian of the Ministry of Agriculture, Fisheries and Food, who will speak on 'State libraries and government publications'; Mr W. E. Tyler, Head of the School of Librarianship, Glasgow, on 'The new syllabus'; and Mr J. A. Tait, Lecturer at the Glasgow School of Librarianship, on 'Classification in the sixties'. There will be a choice of visits to some major Edinburgh libraries.

Newbattle Abbey is eight miles from Edinburgh. The cost for the week's

course, including board and residence, will be £7 10s. The closing date for bookings is 15th June, and programmes and application details are obtainable from Mr J. W. Cockburn, F.L.A., Deputy City Librarian, Central Public Library, George IV Bridge, Edinburgh 1.

Open Days

Details have been received of Open Days arranged by certain Research Associations and DSIR Stations. Applications to attend should be made in each case to the Director of the Research Association or Station concerned.

Open Days notified are as follows:

25th-29th April: British Boot, Shoe and Allied Trades Research Association, Kettering;

1st May: British Coal Utilization RA, Leatherhead;

2nd May: Fruit and Vegetable Canning and Quick Freezing RA, Chipping Campden;

7th-9th May: British Leather Manufacturers' RA, Egham;

8th-9th May: British Food Manufacturing Industries RA, Leatherhead;

13th-17th May: National Physical Laboratory, Teddington;

14th-16th May: RA of British Paint, Colour and Varnish Manufacturers, Teddington.

Occupational Safety and Health Abstracts

The International Occupational Safety and Health Information Centre (CIS) has decided to issue its abstracts in the form of a monthly bulletin as from January 1963 for the benefit of those organizations who do not require the more elaborate card service. Subscribers will be entitled to all the CIS services (Information Sheets, CIS News, provision of photocopies and microfilms, etc.). The annual subscription for this publication is \$20 or the equivalent in national currency. Full details and free specimen copies can be obtained from the CIS, c/o International Labour Office, Geneva, Switzerland.

Who's Who in Data Processing

American Data Processing Inc. announce the publication of the first edition of *Who's Who in Data Processing*. It is the first biographical reference work listing over 3,500 persons active in the use of data-processing equipment and systems. Also included in this first edition are the names of outstanding pioneers in the development of equipment, and of management consultants, instructors, and editors and authors of publications in the field. It is available from American Data Processing Inc., 22nd Floor, Book Tower, Detroit, Michigan, USA, price \$35.

Information Services in Research and Development

This will be the theme of an exhibition and symposium at the Watford College of Technology during the week of 22nd April. The symposium will take place on Tuesday 23rd April and Wednesday 24th April at 6.30 p.m. The speaker on

the first evening will be Mr B. C. Vickery, of the National Lending Library for Science and Technology, on 'Technical and scientific information services'; on the second evening, Mr R. Snel, of Shell International Petroleum Company Ltd, will speak on the 'Effective use of information services'.

The exhibition will be open to the public from 9 a.m. to 9 p.m. each day from 22nd to 26th April and will be free of charge. There will be a charge of 2s 6d for the evening lectures. The organizers are the Research Sub-committee of the Watford and District National Productivity Year Committee; and further information may be obtained from the Chairman of the Sub-committee, Mr Allan Short, Engineering Department, Watford College of Technology, Hempstead Road, Watford, Hertfordshire.

Index Translationum, 14 (1961)

This fourteenth volume is a bibliographical catalogue of 32,931 translated books published in 1961 in seventy-five countries. It is available from Unesco, Place de Fontenoy, Paris 7e, price 102s 6d.

MACHINES THAT INTERACT WITH MEN

to teach, test, and help to do a job

GORDON PASK, M.A.

System Research Limited

*Summary of a talk given at Aslib Winter meeting
London, 21st January 1963*

THE teaching machine is both an instrument and a natural development of activities pursued in experimental psychology. Whilst the earliest machine was devised by S. L. Pressey in 1920, none was developed for teaching purposes until the late 1940s when Professor Skinner of Harvard University realized the potentials of these machines in 'programmed' learning.

In the learning process the individual acquires knowledge in stages. If the steps in this process are small and closely inter-related then the learning process becomes relatively quick and easy. Certain subjects lend themselves to this technique and linear programmes can be devised whereby questions can be asked at each stage which lead the student to the correct solution. Such programmes can be operated using very simple equipment including books. Machines, however, have an advantage since they give more control over learning. As the material can be presented on microfilm and the machine requires only simple press-button technique, the equipment can be cheap (as low as £55) and in addition it can be used for a number of different programmes.

Since man has a finite rate of learning, the automated teaching method must of necessity vary in complexity and intelligibility. His rate of learning will depend upon a number of factors including his ability to memorize and his understanding of the words used, particularly in their context. To learn fully he must actively participate and be challenged at each stage. This requires a programme which allows students to progress according to their ability, back-tracking to earlier stages or relaxing the pace and the level of difficulty whenever it becomes clear that a step has not been fully understood.

This technique requires branching programmes and more sophisticated machinery. These more sophisticated machines can learn from the mistakes made by the student and adapt themselves to assist his learning process or even the manual skill he is being taught. Simple examples of such machines are those designed to teach the keyboard operation of punch card machines, or quicker reading. An example is the so-called Self-organizing Automatic Keyboard Instructor (SAKI) where the pupil operates a normal keyboard according to a series of instruction cards. To facilitate his keyboard exercises the keys light up on a cue display as well as the exercise card. As his speed and accuracy increase the machine adapts itself to his ability, speeding up or slowing down where necessary, providing less and less visual assistance until he accomplishes the skill required. A quicker reading machine has the same ability to adapt itself to the ability of the pupil. This is achieved when the pupil presses a button

opposite the correct answer to questions testing his comprehension of the passages which have been illuminated in sections for him to read. The machine can react by illuminating variable lengths, passages at faster or slower speeds.

The combination of machine and pupil becomes a self-organizing system in these advanced adaptive machines. The machine can constantly challenge the pupil and yet, whilst providing the student with a sense of achievement, can alter its challenge to suit the ability of the student to ensure there is no sense of failure.

Experimental adaptive machines have now been devised which can study group behaviour. One such machine can measure the performance of each individual and assess the ability of the group to act as a team. It is clear from progress already made that it will be possible to create a machine able to assist an individual to clarify his problem and so feed him with the information he may need—a mechanical reader's adviser. Whilst at present such machines are expensive to design and produce there is no reason to doubt that they will become an economic proposition.

THE TESTING OF INDEX LANGUAGE DEVICES

CYRIL W. CLEVERDON

Director, Aslib Cranfield Research Project

and

J. MILLS

Deputy Director, Aslib Cranfield Research Project

One-day conference, London, 5th February 1963

INTRODUCTION

THE evaluation of information retrieval systems has recently become an important matter. In the past, however, most reports or proposals on this type of work appear largely to have ignored the efficiency of operation of the central core of an IR system, namely those operations concerned in the compilation and use of the index. The only aspects to receive consideration are the physical form of the index and the design of thesauri or classifications. The former activity has been slanted towards the use of computers and has tended to assume that this type of equipment will, *ipso facto*, give an improved performance but has made no attempt to justify cost factors which may be one hundred times that of conventional techniques. Work on thesauri and classifications, where it has been practical in nature, appears to consist of compiling lists of terms which go out of favour as quickly as any list of subject headings in the past; the more popular theoretical approach is the setting up of models or the use of increasingly abstruse and complex algebras. From the results and conclusions of the experimental work at Cranfield, it would seem that many of these investigations are comparatively trivial.

In this paper we set out the fundamental operations involved in compiling and using an index, show how the various factors can influence the operating efficiency, and consider the methods to be used in the present Aslib Cranfield investigation.

DEFINITIONS

As the analysis of indexing has become more detailed, there has been an increasing requirement for the more precise definition of the various operations. We have endeavoured to use terms in their conventional meanings wherever possible, but it has frequently been necessary to modify, or to find new terms.

An *information retrieval system* is the complete organization for obtaining, storing and making available information. This could be a definition of a

conventional library, but an IR system would be expected to exploit the information in a positive manner and to have extra facilities such as people on the staff capable of evaluating information before it is passed to the inquirer. It would also be expected to have a *subject index* to the items in the store, the index being the physical equipment which permits of the retrieval of references in the searches. The index may be in the form of a card catalogue, a printed list, a set of peek-a-boo cards, a computer, or any other convenient equipment. The arrangement within the index will depend upon the *index language** and this may be a straightforward alphabetical arrangement of terms, or a classified arrangement of terms, or any variation of these methods. The index language may be used in a *pre-co-ordinate* or *post-co-ordinate* manner. The former implies that the co-ordination of separate concepts is done at the time of indexing and the entries in the subject index will show this co-ordination. The latter implies that the co-ordination of concepts is done at the time of searching, so the entries in the subject index will refer only to single elements.

The *vocabulary* of the index language is the complete collection of sought terms in the natural language, including all necessary synonyms, that are used in the set of documents and are therefore required for entry points to the index language. An *index term*, on the other hand, is an actual term or heading used in the index language, and may be a word or words, as with alphabetical subject indexes, uniterm indexes or zatocoding, or may be notational elements, such as a group of numbers in the Universal Decimal Classification, or may be non-meaningful groups of letters, as in the Western Reserve University Metallurgical Index.

Concept indexing is the intellectual process of deciding which are the concepts in a particular document that are of sufficient importance to be included in the subject index. Conventionally, this involves a 'Yes' or 'No' assessment, for a concept either is, or is not, considered worthy of inclusion in the subject index. It is possible for the indexer to indicate the relative importance of different concepts in a document by *weighted indexing*, which involves the assignment to each concept of a weighting number.

The *exhaustivity* of the concept indexing is a comparative term; at a high level it implies that an entry is made for every possible concept in a document. At a low level it implies that a selection has been made and a smaller number of concepts have been used. *Specificity* is also a comparative term. A concept can be translated into an indexing language in such a way that the index term is co-extensive with a concept. This is a high level of specificity and implies that the index term covers the concept but nothing else besides the concept. Alternatively, the translation can be to a less specific (often called 'broader') index term which includes the concept being indexed as well as other concepts.

Syntactic indexing implies the use of headings which display the relationship between the various elements, as distinct from those which merely show the existence of several attributes relevant to the subject indexed.

* In recent papers we have been using the term 'descriptor language' following on the usage of Mr B.C. Vickery. However, Mr Calvin Mooers has pointed out that the word 'descriptor', although now somewhat debased in common usage, originally had a precise meaning. We have agreed to restrict our use of the word to this precise meaning and have therefore decided upon the term 'index language'.

A *search programme* is the formalization of the search request and it can show the same characteristics as outlined above for indexing, i.e. it entails a statement of the concepts, which can be at varying levels of exhaustivity, and can be translated into indexing terms of varying specificity.

The *operating efficiency* of an index language will depend upon its performance as regards recall and relevance. *Recall ratio* equals $\frac{100R}{C}$, where C equals the total number of documents in the collection which have an agreed standard of relevance to a given question, while R equals the number of those relevant documents retrieved in a single search. On the other hand, *relevance ratio* equals $\frac{100R}{L}$, where L equals the total number of documents retrieved in a single search. Operating efficiency is affected by the exhaustivity and specificity of the indexing, as well as the search programme, and by varying any of these factors, one will obtain a performance curve which plots recall ratio against relevance ratio. *Economic efficiency* deals with the performance of the complete index.

A *set of documents* is any collection of documents which are, or will be, used as the basis of a single subject index. The set can be large or small, restricted to an organization's research papers, or be a heterogeneous collection of journal articles, research reports, patents, etc., in many different languages, but homogeneous in that they will be used as the raw material of a single index. A *set of questions* is a collection of questions to be put to a single subject index, either at present, or at any time in the future when the index is still intended to be operating.

THE PREPARATION OF AN INDEX

Assuming there is agreement concerning the set of documents to be indexed, the following operations have to be carried out in compiling and using an index:

1. Assess the subject matter of each document in relation to the requirements of the users, and decide which subjects should be included in the index. This is concept indexing, and is at present, and for the foreseeable future, an intellectual operation. With a pre-co-ordinate index, it is also necessary to decide on the appropriate combinations of concepts and, if the index language is to show relationships, the syntax.
2. Translate the subject concepts into the index language. This is a clerical task, except in those cases where a new term has to be added to the vocabulary of the index language.
3. Place the indexing decisions into the index, which may involve preparing and filing catalogue cards, punching holes in a card or cards, or making marks on tape. This again is a clerical process.
4. Make a concept analysis of the question and decide on the priority of alternative search programmes. As with concept indexing, this is an intellectual process.
5. Translate the search concepts into the index language, a purely clerical task.
6. Operate the physical retrieval mechanism of the index.

The Aslib Cranfield Project has been primarily concerned with operations 1, 2, 4 and 5, and it has only been due to the necessity of having the index in the physical form that we have been involved with 3 and 6. It is certain that these two latter points play no part in deciding on the operating efficiency, except in so far as that one technique might be more, or less, prone to clerical errors than another. They can, however, significantly affect the economic efficiency of an index.

Involved in these operations is the variable of the index language. Whichever type of index language is used, it is certain that all the stages 1 to 6 have to be carried out. More important is it to note that the only two operations which have a true intellectual content are completely divorced from any consideration of the index language.* The basic concept analysis of the document and the basic concept analysis of the question, with the auxiliary decision of which concepts should be included in the index or the search programme, will be the same irrespective of which index language is used. It is probably the case that many indexers tend to think in the terms of the index language and their concept indexing decisions may be thereby influenced, but fundamentally it is true that concept indexing is a separate process which should not be affected by the index language.

INDEX LANGUAGES

The common basic requirement of all index languages is a complete vocabulary of all the sought terms, including all necessary synonyms, that are used in the indexing of a set of documents. This may be likened to an uncontrolled set of uniterms, and must be the basic structure for all index languages; and, whatever ultimate form an index language may take, it can only operate at maximum efficiency by having such a vocabulary. To this basic structure can be added a number of devices which are intended to improve the recall ratio or the relevance ratio. These devices (see Vickery¹) can be listed as follows:

A. *Devices which, when introduced into an uncontrolled vocabulary of simple terms, tend to broaden the class definition and so increase recall*

1. Confounding of true synonyms.
2. Confounding of near synonyms; usually terms in the same hierarchy.
3. Confounding of different word forms; usually terms from different categories.
4. Fixed vocabulary; usually takes the form of generic terms, but may use 'metonymy' for example, representing a number of attributes by the thing possessing them.
5. Generic terms.
6. Drawing terms from categories and, within these, facets; this controls the generic level of terms, and to a certain degree controls synonyms.

* It is, of course, true that the compilation and maintenance of the index language can fairly be said to be an intellectual task. Its use, however, within the context of an indexing operation is a separate matter which requires only clerical operations.

7. Representing terms by analytical definitions (semantic factors), in which inter-relations are conveyed by relational affixes or modulants; the generic level will usually be more specific than when control is by categories.
8. Hierarchical linkage of generic and specific terms, and, possibly, of co-ordinate terms.
9. Multiple hierarchical linkage, i.e. linking each term to a number of different generic heads.
It should be noted that devices 8 and 9 are not usually (as the others are) methods of class definition determining the structure or constituents of individual subject descriptions; they are ancillary devices (manifested as systematic sequence, or classified arrangement, as a thesaurus, as a network of *see also* references, etc.) indicating the existence of classes wider than these individual descriptions.
10. Bibliographical coupling, and citation indexes; these, also, are ancillary devices which indicate the existence of wider classes, the latter reflecting the use made of the documents and a probability of relevance arising from this.

B. *Devices which tend to narrow the class definition and so increase relevance*

11. Correlation of terms: although implicit in some form in all practical indexing, this device is not inevitable; i.e. the use of a single term to define a class may retrieve quickly and economically, if the term is sufficiently rare in the context of the system.
12. Weighting, i.e. attempts to express the particular relevance of each concept used in indexing a document to the whole document. It may take two forms:
 - i. An attempt to assess subjectively the relative 'information content' of each term within the context of the system;
 - ii. An objective measure, based on statistical counting of the word frequencies, etc.
13. Indicating connections between terms (interlocking):
 - a. Without explicit expression of particular relations (interfixing); this may take at least three forms:
 - i. Partitioning of the document; e.g. if the same document deals with the Conductivity of titanium and the Hardness of copper at a particular temperature, partitioning makes it clear that the document has at least two separate 'themes'.
 - ii. Interfixing within a theme (or 'information item'); e.g. Lead (1) Coating (1) Copper (2) Pipes (2) makes it clear that the subject is the Lead coating of copper pipes and not the Copper coating of lead pipes.
 - iii. If terms are recorded physically in a linear sequence, a citation order (a regulated sequence in which terms from different categories are cited), will convey relations.

- b. With explicit expression of particular relations; this is necessary in cases where simple interfixing cannot cope with the possible ambiguities; e.g. to distinguish which particle is the projectile, which the target, and which the product, in a report in nuclear physics. Two forms are usually recognized:
- i. Role indicators: these are usually limited in number and express the basic or most common relations found in the subject field concerned; e.g. Product, Starting material.
 - ii. Relational terms: these are more freely developed, the name of a relation being used in the same way as any other term. It may, however, be cited only in the framework of a limited number of fundamental relations, as in Farradane's system.

A third form sometimes to be found in conjunction with *a*, *iii* above is that of distinctive facet indicators which convey clearly the exact category to which the next term belongs.

Any operating index language is an amalgam of some of these devices; for example a modern faceted classification uses hierarchical linkage within its facets, combines (correlates) terms from different categories (according to a strict citation order so as to maximize the mutual exclusiveness of its classes), provides a degree of multiple hierarchical linkage through its relative alphabetical index, controls synonyms, may control near synonyms, and may confound word forms to a mild degree.

A machine-orientated retrieval system may use correlation as its basic device, but supplement this with confounding of synonyms, confounding of near synonyms, of word forms, show hierarchical and multiple hierarchical linkage to some degree (often via a thesaurus), and use links and roles.

A simple, manual Uniterm system will use correlation as its basic device, but may add to this the confounding of true synonyms, of near synonyms and (possibly) of word forms, a modest degree of hierarchical linkage, and roles.

PERFORMANCE MEASUREMENT

The technique evolved in the Aslib Cranfield tests for the measurement of operating efficiency depends on two factors—the percentage of relevant documents retrieved as against the total of relevant documents in the collection (recall ratio), and the percentage of relevant documents among those actually retrieved (relevance ratio). The original Aslib Cranfield project established the former by conducting searches for questions which had been based on documents known to be in the collection, and the result of this showed that, on an average, about 80 per cent of the source documents were being retrieved. It could be said that this figure did not have particular significance, since it is obviously possible to obtain 100 per cent recall by looking at every document in the collection. Quite apart from going to this extreme, it would have been possible to improve the figure of 80 per cent by 'broadening' the search programme or, as we should say, by making the search programme less specific and/or less exhaustive. The only control on this figure of 80 per cent was that a limit was

put on the level of exhaustivity of the search programme. (See Cleverdon,² page 14), but this was rather crude, and (as discussed in chapter 6 of the same reference), an attempt was made to assess the relevance ratio. This proved to be exceedingly difficult, but it was obvious that it was an essential part of performance measurement, and, in the test of the WRU metallurgical literature³ the work was done more thoroughly, as is discussed later in this report. The result of a complete analysis of recall and relevance means that it is possible to plot a series of points, depending, for instance, on the search programme, and produce a performance curve as shown in Fig. 1a.

ASSUMPTION FOR FUTURE WORK

A basic premise of the following arguments is that, for a given set of documents and a given set of questions, there will be a maximum retrieval performance; whatever type of index language is used, the performance curves will not be materially altered, and, in fact, the only reason for any major variation from this curve will be inadequacies of the intellectual performance in decisions concerning subject concepts, either in indexing or in searching. For sets of documents in different subject fields, the resulting performance curves would probably differ, and if the same set of documents were used in two separate situations, since there could be two different sets of questions, this in turn could result in different performance figures. Tests at Cranfield have been concerned mainly with the subject fields of science, engineering, and metallurgy, and with these types of document sets and question sets, it appears that the maximum retrieval performance would be as in Fig. 1a. If the subject matter of the collection were organic chemistry, the resulting performance curve might be as Fig. 1b; for sociology it might be as Fig. 1c.

It has to be assumed in this discussion that we are considering idealized conditions, and do not have to take into account losses due to human error. This has been investigated in the first project, and the general allowance to be made for this is known or, alternatively, can easily be ascertained in any given

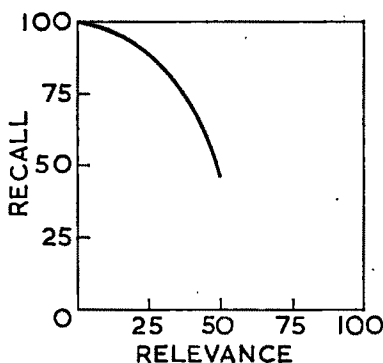


FIGURE 1a

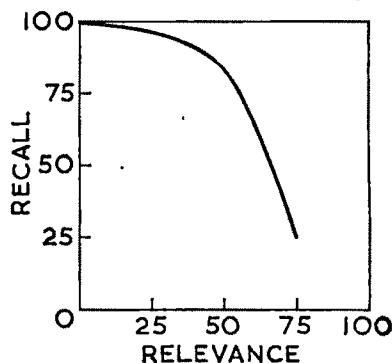


FIGURE 1b

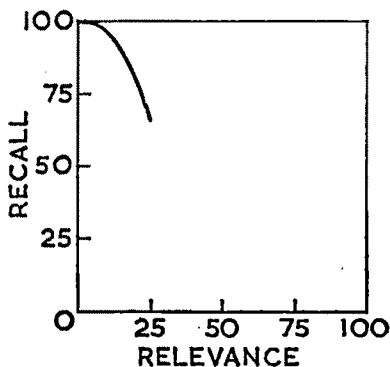


FIGURE 1C

situation, by using the Cranfield test procedure. We have postulated that there is a fixed maximum performance curve for any given set of documents and questions, and have suggested that, with the type of document and question sets tested at Cranfield, this might range from 100 per cent recall at less than 1 per cent relevance to 50 per cent recall at 30 per cent relevance. The important problem to investigate is how an index can be operated most efficiently at any particular point or within any particular range. As an example, it might be a requirement of an index that it should have a recall level of not less than 95 per cent. Alternatively, the requirement may be that the index should normally operate at a level of 25 per cent relevance ratio, but that it should, when required, be capable of giving a recall figure of 90 per cent.

In such an investigation, there are a number of factors to be considered, and of major importance is the concept indexing. Some groups working in this area seem to place more emphasis on search analysis, in finding how variations in search programmes will affect the efficiency, but this seems to be rather a cart-before-the-horse approach. It is at the stage of concept indexing that the future potential performance of the resulting indexes is determined; if a concept is not included, it will not be possible to recall the particular document by that concept, and vice versa. Concept indexing is, it must be emphasized, an intellectual process that cannot be avoided. Current literature sometimes implies that keyword-in-context title indexing, for instance, is automatic indexing. It is automatic in its preparation of the physical index, but the intellectual stage of concept indexing is still there; the only difference is that in this case the concept indexer is the person who wrote the title.

It is the decisions of concept indexing which result in the level of exhaustivity achieved. The extremes of exhaustivity range from where the whole text is included to where only a single concept is indexed for each document. The effect of high or low exhaustivity on the basic performance curve can be readily shown. 100 per cent recall can always be obtained by doing no indexing but by having available for searching the text of every document in the collection. On the other hand, if only a single concept from each document is included in an index, then it is apparent that there will be a considerable drop in recall. We can, therefore, say that, if all other factors are held constant, the effect of lower-

ing the level of exhaustivity will be to drop the recall figure. This will in turn result in an improved relevance figure, and briefly it can be said that

- a high level of exhaustivity of indexing results in high recall and low relevance;
- a low level of exhaustivity of indexing results in low recall and high relevance.

Little work has been done on the effect of exhaustivity of indexing, and practice varies widely (see chapter 7 of reference 4) without the appearance of any positive reasoning behind the decisions. Inevitably a high level of exhaustive indexing results in higher input costs, and this could be a determining factor with certain physical forms of index. In the Western Reserve University test an attempt was made to ascertain the effect of varying the exhaustivity with the facet index that was prepared at Cranfield. In this index the average number of entries originally included for each document was $12\frac{1}{2}$, and the effect of reducing this by stages to an average of three entries per document was investigated. Table 1 shows the effect that this had on recall and relevance of the documents.

TABLE 1
RECALL AND RELEVANCE RATIO IN FACET CATALOGUE OF WRU TEST
AT VARYING INDEX ENTRIES

<i>No. of entries</i>	<i>No. of documents retrieved</i>	<i>Relevance 2</i>		<i>Relevance 2 and 3</i>	
		<i>Recall ratio</i>	<i>Relevance ratio</i>	<i>Recall ratio</i>	<i>Relevance ratio</i>
		%	%	%	%
$12\frac{1}{2}$	891	83	16.3	64.1	34.6
8	824	80.6	17.1	60.6	35.5
5	643	73.1	19.9	50.7	38
3	491	64.6	23	42.1	41.3

This effect will operate irrespective of which index language is used, and, in passing, it should be noted that the same situation prevails in reverse with the decisions concerning concepts to be used in the search programme. However, before going into the matter of search programmes, we will consider the translation of the concept indexing into the index language.

The aspect of the input stage which is concerned with index languages is specificity, and we suggest that, in so far as their operating performance is concerned, a fundamental difference—and probably the most important difference—between index languages is their hospitality for specificity; this we now consider in its simpler form and show its direct relationship to the index language. It is assumed that an index language includes, as a minimum, all the categories of the subject field, whether given in detail or not, of the documents being indexed.

The first stage, i.e. concept indexing, with its decision concerning the level of exhaustivity of indexing, is assumed to have been completed for a given document and we have concepts A_1 , B_1 , C_1 , D_1 , E_1 and F_1 . The next stage is translating these into the index language. Assume three hypothetical index languages, I, II, and III containing respectively, 10,000, 1,000 and 100 index

terms. In index language I, there is a straight translation of the concepts into $A_1(I)$, $B_1(I)$, $C_1(I)$, $D_1(I)$, $E_1(I)$, $F_1(I)$. Index language II translates into $A(II)$, $B(II)$, $C(II)$, $D(II)$, $E(II)$, $F(II)$ (where A is the containing head for A_1 , A_2 , A_3 and B the containing head for B_1 , B_2 , etc.). Descriptor language III translates into $ABC(III)$ and $DEF(III)$ (where ABC is the containing head for A , B , C , A_1 , A_2 , etc.).

The level of specificity which can be given to the indexing is obviously very different in each of these three index languages; the result is that in a search where the requirements are for A_1 , B_1 , C_1 , although index language III will retrieve all the relevant documents that are retrieved by index language I, it will also bring out, for example, documents coded A_2 , B_2 , C_2 , resulting in a larger number of irrelevant documents and therefore a lower relevance ratio. In reverse, though the relevance ratio of a search in index language I will be relatively high, it is likely to miss some of the relevant references which would be found by the same search programme by index language III. It might, therefore, be the case that the normal operating level of index languages I, II and III, with all other conditions fixed, would be as shown by points 1, 2 and 3 in Fig. 2. Again, one notes that a lowering of relevance results in higher recall, and of specificity it can be said that

a high level of specificity in the index language results in high relevance and low recall;

a low level of specificity in the index language results in low relevance and high recall.

Considering again the basic performance curve (Fig. 3), we have shown that the maximum recall figure which can be obtained is limited by the level of exhaustive indexing; the maximum relevance figure is limited by the specificity possible in the index language. Therefore, a system which combines a high level of exhaustive indexing with the use of a highly specific index language would have the potentiality, dependent upon the search programme, of operating over the wide range of the curve between points A and B. However, a system which combines a low level of exhaustivity and a less specific index language might not be able to operate beyond the narrower limits shown by points C and D, whatever type of search programme was used. However, if this limited range gives a satisfactory performance figure, then it will be obviously more economical to operate.

It is now possible to consider the effects of exhaustivity and specificity in the search programme. Assume that the concept programme of a question requires that a search should be made for A_1 , B_1 , C_1 and D_1 . If it is decided to 'broaden' the search, then this can be done in two ways. On the one hand, it is possible to drop one of the concepts, so that the search is now for A_1 , B_1 and C_1 . This we would describe as making the search less exhaustive. Alternatively, it is possible to make the search less specific, by substituting A for A_1 or B for B_1 (where A is taken to be an inclusive term covering A_1 , A_2 , A_3 , etc.). It is obvious that by broadening the search in either of these ways, the recall ratio will be improved. In particular, however, we should consider the matter of specificity in indexing and specificity in the search programme. To return to the

index languages considered earlier, if one has coded according to index language III, then it is useless to attempt a programme that has a high level of specificity. In fact, it is impossible to do this, since the index language does not include

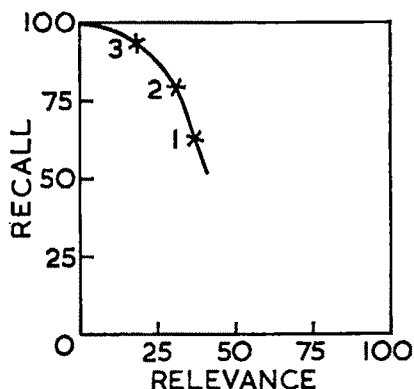


FIGURE 2

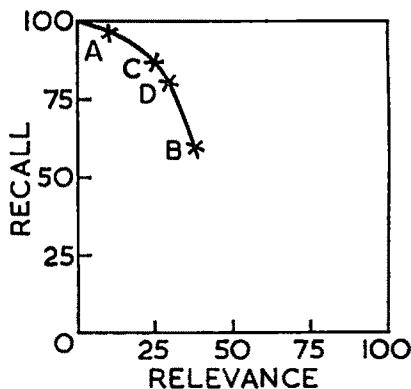


FIGURE 3

index terms of the required specificity. However, with index language I, it is possible to have a highly specific search programme, which would give a high relevance ratio but a low recall ratio (i.e. point 1 in Fig. 2). If it is desired to improve the recall ratio, then the search programme can be made less specific, until it reaches a level of specificity of the term codes of index language III. By this time it can be assumed that the recall ratio will have risen to the same level as with index language III (i.e. point 3 in Fig. 2). It is, therefore, shown that, as far as operating efficiency is concerned, there will be for every index language—depending upon its hospitality for specific indexing—a maximum relevance ratio which cannot be exceeded. It will, however, always be possible (by varying the search programme) to improve the recall ratio along the fixed performance curve up to its maximum level, this being dependent on the exhaustivity of the indexing.

AIDS TO EFFICIENCY

If, as is not wholly unreasonable, we consider as a median in the range of indexing languages, one which consists of nothing except an uncontrolled vocabulary of sought terms, then many of the indexing devices mentioned in an earlier section of this paper can be seen to be working in opposing directions. Any device which reduces the number of index terms is working towards improved recall, with the inevitable result that there will be a fall in relevance. Other devices, such as role indicators, are, in effect, increasing the number of index terms and are thereby improving relevance but decreasing recall. These devices have been discussed in an earlier section and the part they will play in the further work will be considered later, but we would now consider the effect of one type of device which is found in many operating index languages.

In the introduction, we said that much of the present theoretical work being done on index languages was trivial. This comment is based on what appear to

be logical deductions from the experimental work undertaken at Cranfield. The theoretical work which we have in mind is all concerned with what might be described as the grouping of the terms in the index language. This work is proceeding in many directions; facet classification, clumps, logical associations, word pairs, etc. To describe all this work as trivial shows that we have moved away from a main stream of development in information retrieval, and it may appear difficult to justify the statement. We would first make the point that we say that this work is trivial and do not say that it is useless. This could be translated into more precise figures by suggesting the following. Assume an imperfect index language, covering the field of engineering and metallurgy, which consisted only of an alphabetical list of index terms, and with a normal operating efficiency of 75 per cent recall and 20 per cent relevance. If one gave to this index language the additional device of a grouping of the terms, then we suggest that the recall ratio of 75 per cent might be achieved with a relevance of 21 per cent or, alternatively, that with a relevance of 20 per cent one might have a recall ratio of 78 per cent.

The purpose of any grouping of terms is to lead the searcher to related terms which might have been used by the indexer for relevant information. It is logical to assume that this is a worthy objective and it has been a common assumption that it is also a vitally important objective. Why is it, in fact, of such little importance? The reason is because it is incorrect to assume that the comparison is between an index language without a grouping of terms and an index language with a grouping of terms. The comparison is, in actual fact, between an index language with a pre-arranged grouping of terms and an index language with a grouping of terms that is special and personal each time it is used. In other words, a searcher, whether a librarian or a subject specialist, is capable, to a greater extent than has been generally appreciated, of making a grouping of related terms at the time of the search and in relation to the particular subject of the search. The problem is that a single classification schedule, a single set of cross-references, a single set of thesauri-type headings, or a single set of any other form of grouping, however logically or abstrusely derived, is most unlikely to be of equal value to all the different types of user of an information retrieval system. With a metallurgist, a chemist, a mineralogist, a mining engineer or a design engineer, a single term might well have five different sets of associations, and the individual concerned will be able to decide for himself, at the time of the search, the set of related terms that would be an improvement on a set of pre-arranged groupings. It would, therefore, appear logical that the best method would be to devise a separate set of groupings for each type of user, so as to maximize the chances of improving recall with a minimum drop in relevance. It should be noted that such groupings can be devised independently of the index language, and can therefore be used with any index language.

It is, however, necessary to qualify the above comments, and also to return to the point, raised earlier, concerning the presumed difference in the shape of the performance curve for subject indexes in different subject fields. If we consider pure data retrieval, of the type where it is required to know, for instance, the names of all persons in an organization who joined more than ten years ago, who are graduates and whose salary is less than £1,800 a year, it might be

expected that all the relevant information and only relevant information would be retrieved. As one passes from the field of data retrieval to the field of information retrieval, the terminology becomes less precise in its meaning, there is an increasing number of errors due to confusion and the performance of the subject index becomes progressively worse. We have suggested that chemistry, being more precise in its terminology, would permit the compilation of a subject index having an improved performance curve in comparison with an index in the field of engineering and metallurgy of the type tested at Cranfield. On the other hand, many areas in the social sciences have a vague terminology. For example, in the opening pages of this paper, it was considered necessary to give the definitions of many terms that have been used, and it would take little effort to find examples of the same term being used with other meanings, or other terms being used for the same meaning. In such circumstances, it is hardly surprising that retrieval performance is hampered, and it is reasonable to suggest that there would be an increased requirement for a grouping of the index terms. Workers in the field of engineering and metallurgy appear to be sufficiently well acquainted with the terminology of the subject field to make their own grouping of terms, with the result that an index language which lacks a pre-arranged grouping of terms is only marginally inferior to an index language which has such a grouping of terms. We can, therefore, assume that any subject field that has a more precise terminology than engineering will have even less need for a grouping of the index terms.

THE FUTURE WORK OF THE CRANFIELD PROJECT

It might be said of Cranfield I that its main endeavour was that it tried to measure the operating efficiency of complete indexing languages in a simulated real life situation, and also that it used, as its major measure of performance, a relatively crude gauge of relevance based on the retrieval or non-retrieval of a single source document. Cranfield II will differ in both major respects; firstly, it will try to measure the impact on recall and relevance of particular indexing devices—the elements which go to make up a complete index language; and secondly, it will try to use decidedly more precise measures of relevance.

The devices that have been identified are listed earlier, but some further observations on them seem to be called for:

- i. Their significance is that they provide different ways of defining classes, i.e. different ways of indicating relations between the concepts which are the subject of a document. Consequently, they differ in the degree to which they produce broader or narrower classes, and thereby assist or hinder specificity and exhaustivity.
- ii. The function of class definition in indexing is that the assignment of a document to a particular class or classes (x, say) may allow us to ignore other classes (not-x), on the assumption that the kind of document we seek, if it is not in class x, cannot be in class not-x. Classes are established which will predictably include certain documents, and as predictably exclude others. This assumption can never be realized fully in practice, for classes in documentary classification can never be quite

mutually exclusive. A documentary subject description ABCDE is never more than a statement of what the document is *mainly* about. ABCDE does not necessarily exclude FG; these may feature in it in some minor way. A report on 'Laminar boundary layer flow' will reveal, in a single casual aside, half-way through the text, that 'Three-dimensional boundary layer' is assumed. If this concept (three-dimensional) is not indexed, it does not mean that the concept really is banished from the subject content of the article. It is this awkward indeterminacy of the literature to be indexed which we seek to circumvent by exhaustive indexing.

- iii. Different class definitions have different focusing or resolving power. If we take the simple correlation of keywords in the title and abstract of a document as a relatively crude device for establishing classes, then other devices, if added to these, either enlarge the scope of the classes or constrain them further. For example, to confound verbal forms, so that the class designations 'Heat', 'Heated', 'Heating', 'Hot', are extended to designate a single class covering all these different concepts, would clearly broaden the description. This would inevitably increase recall and reduce relevance—but by how much? Or, if we now introduce role indicators into our index language, so that a class designation 'Zinc' becomes several different classes according to the role played by Zinc in the particular subject description, e.g. Zinc (starting material), or Zinc (product), or Zinc (agent), then these classes are clearly narrower, and recall will now decrease and relevance increase. But again, by how much?
- iv. Certain of the devices, such as generic and specific terms linked hierarchically, might appear to perform a function different from that of mere class definition. The difference between the operation of *arrangement* in an index, which is designed to display relations between ostensibly separate classes (the chief function normally associated with classification), and the operation of class definition, is often overlooked. In traditional classification, different principles of division might be applied to produce different classes, and then these classes are arranged, usually in some systematic order. But the two operations, of division to produce classes, and the arrangement of those classes, are quite distinct.

The functions of arrangement are well known. It may show clearly various connections between classes (and this function is itself a looser form of class definition); it may help the programming of searches, by suggesting other approaches; it may be economically efficient in the performance of these functions by reason of physical juxtaposition of entries or documents. Cranfield I appeared to indicate that the differences in the arrangement of classes (full classification, A/Z direct, A/Z indirect—i.e. alphabetico-classed) are only of marginal importance in retrieval. But we need to remember context here; the context for which the findings seemed to be valid was that of indexing, not the physical arrangement of documents (which rules out the entire field of shelf display); of a special field, rather than a general collection, where interconnections between classes are more difficult to display thoroughly and

far more difficult for a librarian to carry around in his head; of indexing by experienced and skilled indexers, with equally intelligent searchers.

Is arrangement, then, a device to be tested here? Hierarchical linking is certainly to be tested, but how it is implemented—whether by a classified arrangement in the index itself, or by a thesaurus, or by systematic connectives in an alphabetical catalogue—is probably outside the field of our inquiry just now. But independently of the convenience of different methods of performing the function of hierarchical linkage, the extension of the field of likely search which this device implies may be regarded as a form of class definition, whereby membership of a given class carries with it an explicit or implicit indication of the existence of a wider class containing it. Much the same may be said of semantic factoring; for example, to index 'Tempering' as a kind of process, acting on a metal, making use of heat . . . is another device for extending the field of likely search, of broadening the effective class definition.

2. It might be argued that an index language is more than the sum of its parts, and that evaluation of the contribution to recall and relevance of isolated devices will not help to evaluate the complete index languages which are the practical concern of workers in information retrieval. But the evaluation of complete languages is clearly incomplete so long as we do not know which features of these languages are making them work as they do. For example, it could be argued that the good performance of the Universal Decimal Classification in Cranfield I owed much to the unusually thorough A/Z index made for it. It has already been observed that a complete language will invariably contain an assortment of different indexing devices, and the investigation should give some definite measure of the separate contributions these devices make to recall and to relevance.

METHOD OF INVESTIGATION

To obtain reliable measurements of the impact on recall and relevance of the different devices requires careful precautions for their isolation. This will be done by operating in the laboratory conditions which are provided by a set of questions and a strictly limited number of documents providing the answers to be retrieved, so that there can be a 'closed' collection, in which the relevance to each question of each document in the collection is known. The questions and documents are being assembled as follows.

The assumption is that a research paper is written as the result of an investigation which has been undertaken to provide the answer to a question or questions in the mind of its author; also, that if an author cites references these must have something to do with the subject of the paper. In the field of high speed aerodynamics there are generally from five to ten references attached to each research paper. We are writing to four hundred or more authors of research papers (both theoretical and experimental) in this field. Each author is asked to state, as nearly as possible in the form of a search question, the basic problem which was the reason for the investigation. Also, if there were any subsidiary questions which arose in the course of the work, he is requested to enter up to

three of these (see Fig. 4, sheet 1). He is then asked to indicate the relevance of the references to each question in the following scale of 1 to 5:

1. References which are a complete answer to the question. Presumably this would only apply for supplementary questions, i.e. (B), (C) or (D) since if they applied to the main question there would have been no necessity for the research to be done.
2. References of a high degree of relevance, the lack of which either would have made the research impracticable or would have resulted in a considerable amount of extra work.

ASLIB CRANFIELD INVESTIGATION INTO
PERFORMANCE OF INDEX LANGUAGES

Please complete and return to:
C. W. Cleverdon,
The College of Aeronautics,
Cranfield, Bletchley,
Bucks., England.

AUTHOR J. F. Clarke
TITLE Reaction-resisted Shock Fronts.
REFERENCE College of Aeronautics Report No. 150, May 1961.

BASIC QUESTION

(A) *Has anyone investigated the role of chemical reactions in determining shock wave structure?*

(B) *Papers on acoustic wave propagation in reacting gases.*

(C) *Have other types of 'non-viscous' compression waves been investigated analytically or observed experimentally*

(D) *Is there any simple, but realistic, "model" gas which can be used to expedite analysis?*

FIGURE 4 (SHEET 1)

LIST OF REFERENCES

Ref. No.	ASSESSMENT			
	Question			
	A	B	C	D
1. Clarke, J. F. Flow of chemically reacting gas mixtures. College of Aeronautics Report 117.	5	1	5	3
2. Clarke, J. F. Linearized flow of a dissociating gas. Jnl. Fluid Mech., 7, 1960, pp 577-595.	5	1	5	5
3. Griffith, W. C. and Kenny, A. Jnl. Fluid Mech. 3, 1957, p. 268.	5	5	1	5
4. Lighthill, M. J. Survey in Mechanics. Ed. by G. K. Batchelor and R. M. Davies, Cambridge University Press, 1958.	2-3	3	1	5
5. Lighthill, M. J. Dynamics of a dissociating gas. Jnl. Fluid Mech., 2, 1957, pp 1-32.	5	5	5	1

FIGURE 4 (SHEET 2)

3. References which were useful, either as general background to the work or as suggesting methods of tackling certain aspects of the work.
4. References of minimum interest, for example those that have been included from a historical viewpoint.
5. References of no interest.

The references will now constitute the basic indexing collection. The original papers which cited the references will be discarded, since the correlation between them and the questions they were designed to answer might be undesirably high. Ultimately, it is intended to obtain a collection of some 1,500 documents and

some 400 questions, and for each question there will be some documents with a certain stated degree of relevance to them.

However, it is possible, even probable, that for each question some of the other documents in the collection (i.e. those not quoted as references by the author of the original paper) are also relevant in some degree. The only way to establish this reliably is to examine the whole collection in respect of each single question. This will be done by a number of post-graduate students working in the subject field. Any further documents which they think might be relevant to the question will be sent to the author of the original paper, who will assign relevance values to them as he did to the references in his paper.

What will emerge will be a closed system in which we have a set of documents (about 1,500) and a set of questions (about 400), and in which every document has been checked against every question. Therefore we know, for every question, exactly which documents in the collection are relevant, and to what degree. It might work out, say, that for a given question there will be two documents that are really important, four of which are useful, three which are marginal in relevance, with all the rest irrelevant.

Perhaps the most difficult problem in the above procedure is that of giving a measure of the relevance to a question of a particular document. It is probable that a serious element of subjectivity is likely to remain in any measure attempted. Certainly, to attempt too much refinement here is to risk deceiving ourselves; so we are attempting only the few broad distinctions listed above.

Promise of a more objective measurement of relevance may lie in the degree to which a question description matches a document description, and this is being explored. The distinction between 'relevance' and 'pertinence' drawn in some recent papers is certainly a real one. A document may match a question exactly in the matter of conceptual content (which is what we describe in indexing) and yet be of no use (not pertinent) to the requester because it is in a foreign tongue, is too mathematical in treatment, or has been superseded by another paper. Some of these factors can be handled in the index by means of further description, such as the well-known 'form' divisions of book classification and cataloguing. Others are not measurable in any laboratory investigation (e.g. 'I've read this already').

INDEXING

All index languages consist in the first place of a substantial reduction of the language of the original collection of documents themselves to a relatively small and limited index language. This is true even of automatic retrieval systems in which the whole file is scanned, for the machine has built into it a programme which has already rejected much of the language of the text being scanned, for example its articles, conjunctions, etc.

The indexing devices to be measured may be regarded as refinements, of one sort or another, to be imposed on the crude index language (not just vocabulary, but essential relations also) which is obtained by selecting the significant words in the title, summary and text of the document indexed. So our first task is to establish this crude language for each document, and thus for the whole collection. This must provide the raw material, the basic information regarding the

document's subject content, to allow us to index the document subsequently with maximum exhaustivity and specificity.

These terms, exhaustivity and specificity, have already been defined, but further explanation of their practical implications seems desirable. Both for indexing and for searching programmes, we regard the limits of broadness and narrowness to be contained within a framework determined by the specificity and exhaustivity of the descriptions used. In indexing, the specificity of a term refers to the degree to which it reflects the precise generic level of the concept it stands for; for instance, to index a 'slender delta wing' specifically is to index it as just this, and nothing less. To index it as a 'delta wing' is to describe a genus to which it belongs, not the particular species itself—and such indexing is not specific. It might be called less specific or more generic—the terms are purely relative.

This is, of course, nothing more than the traditional genus/species relation, which is sometimes thought to be the only acceptable relation in strict classification. Its significance in indexing is that it refers to an inclusion relation which is permanent in character; slender delta wing, for example, is always a kind of delta wing, being included in it, and a document on the one will always be of some relevance to a document on the other.

Exhaustivity in indexing refers to the degree to which we recognize (i.e. include in our subject descriptions) the different concepts in a subject which are *not* in a genus/species relation—which, in other words, come from different categories or facets. For example, a paper on the 'calculation of the laminar boundary layer on a slender delta wing' is exhaustively indexed only if all three categories present are recognized, i.e. the kind of aircraft structure, the kind of aerodynamic flow, and the kind of activity directed at the subject (calculation as distinct from experimentation, say). It might be said that exhaustivity covers also the recognition of the different elements in a hierarchy—e.g. of 'slender' as well as of 'delta'. But the idea of specificity takes care of this; a specific indexing description automatically recognizes those links in a chain which constitute sought terms in the indexing sense, as this example demonstrates.

Exhaustivity does cover, however, recognition of different co-ordinate terms from one hierarchy; e.g. exhaustive indexing of a document on the conductivity of metals *a*, *b*, *c*, *d* and *e* would require the separate indexing of each metal.

Except for the Whole/Part relation, these non-hierarchical relations are not inclusion relations, and the connections between members of different categories are not so permanent or so predictable as the connections between members of the same hierarchy, e.g. whereas a search for information on 'Slender, delta wings' would automatically find relevant a document on 'Delta wings', it would not necessarily find a document on 'Boundary layer' to be so.

Earlier on, we have stated that greater exhaustivity in indexing makes for higher recall and lower relevance, whilst greater specificity makes for lower recall and greater relevance. This may puzzle some readers when they consider the effect on a single subject description of these factors. For example, to index a report as being about 'slender delta wings' rather than just 'delta wings' narrows the class definition and so reduces the number of documents in the class—i.e. it

improves relevance, but reduces recall. If we index a report as being about 'experiments on the boundary layer of a delta wing', rather than just 'boundary layer of a delta wing', we again narrow the class definition (this time by correlation), and so reduce the number of documents in the class; again, we improve relevance, but reduce recall.

It is clear from this that we must distinguish between exhaustive indexing in the sense of making a single subject description truly exhaustive of the subject of the document, and exhaustive indexing in the sense of providing the maximum number of retrieval handles or access points necessary to full retrieval. An indexing system could recognize all the three categories in the above subject by means of separate entries, one for the kind of wing, one for the kind of flow, and one for the kind of intellectual operation. At no point would any one subject description be completely precise, i.e. exhaustive of the categories in the complete subject. But they will collectively exhaust it and provide all the required access points. It is this second sense of the term 'exhaustivity' which we use here. Indeed, it is open to argument whether the first meaning is a practical possibility in indexing. A single subject description of a complete report, to be truly exhaustive, would need to be, at the very least, of the dimensions of a full WRU type abstract. If, however, we recognize that in practice, thorough indexing partitions a document into its 'information items' (or 'themes' as we tend to call them), then exhaustive indexing, in the sense of a single subject description of a theme being a precise and exhaustive description of that theme, may well be an objective.

SPECIFICITY AND EXHAUSTIVITY IN INDEXING AND SEARCHING

Below are two grids, showing the degrees of exhaustivity and specificity possible in the indexing of a document and in the framing or programming of a search question (which is really a form of indexing of the subject implied by the question) to which that document is relevant. The document and question are taken, with slight simplifications, from reference 2, page 223.

Document

'An approximate method of calculating the laminar boundary layer on a delta wing.'

EXHAUSTIVITY (number of categories recognized)		
SPECIFICITY (Hierarchical level recognized)	Aircraft structures	Operation on subject
	Aerofoils	Investigation
	Wings	Theoretical
	Delta wings	Mathematical
	Slender delta wings	Calculation
	Aerodynamic entity	
	Flow	
	Laminar flow	
	Laminar boundary layer	

A linear statement of the precise subject omitting implicit terms would be

Slender delta wings—Laminar boundary layer—Calculation

Varying the specificity of indexing—this implies indexing the terms within one or more categories at levels above that constituting 'specific' indexing, e.g. varying the level in the structures category (by omitting the specification 'Slender') would give

Delta wings—Laminar boundary layer—Calculation

or varying the level in the Aerodynamic Entities category would give

Slender delta wings—Laminar flow—Calculation

It should be noted that part of the hierarchy of both 'Structures' and of 'Flow' could be varied in their order of subordination; i.e. they could be altered to: Wings—Slender—Delta, and to Flow—Boundary layer—Laminar. This possibility might add a complication to a pre-co-ordinate system.

Varying the exhaustivity of indexing—this implies the non-recognition of one or more of the categories, e.g. omission in the indexing of the Operations category would give

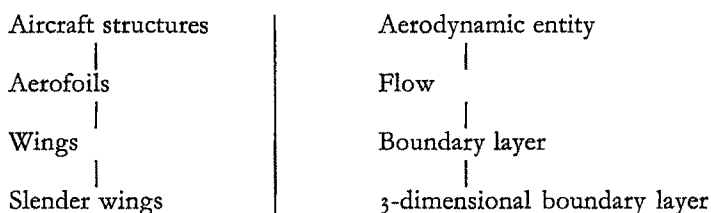
Slender delta wings—laminar boundary layer

Omission of the Structures category would give

Laminar boundary layer—Calculation

Question

Three-dimensional boundary layer on slender wings



A linear statement would be

Slender wings—3-dimensional boundary layer

Varying the specificity in searching is exactly analogous to varying the specificity of indexing, e.g. varying the specificity in the Aerodynamic Entity category would mean a search for the broader subject

Slender wings—Boundary layer

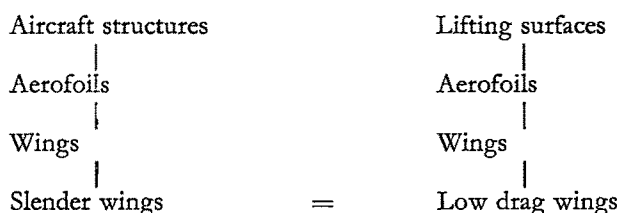
Varying the exhaustivity in searching is exactly analogous to varying the exhaustivity of indexing, e.g. the omission of the Structures category would mean a search for the broader subject

Three-dimensional boundary layer

The hierarchical relations shown above are incomplete in two ways.

1. *Multiple generic links* are not shown. For example, a slender wing, from

another viewpoint, could be characterized as a low drag wing factor. Theoretically any one term may be considered as a species in a number of different hierarchies, and the grid above could be enlarged within each category to show this:



2. *Co-ordinate relations* are not shown, although theoretically these may include potentially useful connections, as *Turbulent* boundary layer on slender delta wing.

In the first place, both the indexing and searching will be exhaustive and specific within the capabilities of a given index language; for instance, our first test might be of a language consisting simply of the correlation of uncontrolled 'uniterms'. In the example above, this would mean a search for the description 'Three-dimensional boundary layer on a slender wing' in a file in which the document is indexed as 'Calculation of laminar boundary layer on a slender delta wing'. We will then vary one element at a time, e.g. we will assume a degree of indexing which is less specific, first within one category, then within two categories, and so on, whilst holding the question exhaustive and specific. At each stage, figures for recall and relevance will be noted. Next, the exhaustivity of indexing is varied, then the specificity of the question, and so on.

After completing this stage, a particular indexing device is introduced which has been absent so far; for example, to the simple correlation of uncontrolled 'uniterms' we may introduce the confounding of verbal forms and note its impact on recall and relevance, again testing within a range of variables of specificity and exhaustivity of indexing and searching.

The number of different permutations of variables implied in the above programme is obviously vast and will constitute one of the major problems. We anticipate, however, that many of the theoretically possible combinations of factors will rule themselves out as having no retrieval or search significance; reducing the specificity of the Structure category to 'Wing', say, and reducing exhaustivity by omitting the Flow category would give us a description 'Wings—Calculation', which is obviously worthless.

PROBLEMS OF BASIC INDEXING

To provide the raw indexing material for subsequent processing we begin by recording the product of the 'concept indexing'. This means that we enter on a master sheet (see Fig. 5) a statement of what we consider to be all the significant terms, indicating as far as is necessary the relations between them. This is being entered at four levels of description, namely:

- i. Abstract
- ii. Themes

B 1069	AUTHOR G. E. Kaattari TITLE Predicted shock envelopes about two types of vehicles at large angles of attack.		Indexer FWL	Date 4/2/63
Base Document A32	REFERENCE NASA Tech. Note D-860			
ABSTRACT	Presents methods for predicting detached shock envelopes of two atmosphere entry vehicles, one a high-drag capsule shape, the other a slender triangular wing (conical vehicle). Predicted and measured shock envelopes were compared for Mach range of 3 to 15 for vehicles at high angle of attack.			
THEMES				
Atmosphere entry vehicle—at high angle of attack—in hypersonic flow (Mach 3 to 15)—detached shock envelope of—theory.	Atmosphere entry vehicle	8	Atmosphere Entry Vehicle	8 Slender 8 Triangular 8 Wing
High-drag capsule entry vehicle—at high angle of attack—in hypersonic flow (Mach 3 to 15)—detached shock envelope of—prediction.	High angle of attack	9	High	8
Slender triangular wing (conical) entry vehicle—at high angle of attack—in hypersonic flow (Mach 3 to 15)—detached shock envelope of—prediction.	Hypersonic flow	7	Angle of attack	8 Conical 6 Standoff 6 Angle
Conical entry vehicles—at high angle of attack—in hypersonic flow (Mach 3 to 15)—shock standoff angles—prediction of.	Mach 3 to 15	6	Hypersonic	7 Continuity
Continuity of mass flow between shock wave and entry vehicle surface.	Detached shock envelope	10	Flow	7 Mass 10 Wave 5 Surface
	Theory	10	Mach 3 to 15	7 High 6 Shock
	High-drag capsule	8	Detached	10 Envelope 10 Theory
	Slender triangular wings	8	Shock	6 Shock 5 Entry 5 Vehicle
	Conical vehicle	8	Envelope	
	Shock standoff angle	6	Theory	
	Mass flow continuity	7	Drag	
	Entry vehicle surface	5	Capsule	

FIGURE 5

*iii. Concepts**iv. Terms*

The abstract provides a brief but general statement of the subject content of the complete document. The themes are required to show the relationship of the concepts, and will be used in connection with such indexing devices as partitioning, interlocking and interfixing. With the concepts, it will be noted that the same concept may occur in different themes, and similarly the same term may appear in two or more concepts. It should be emphasized that we have no particular system in mind when doing this initial indexing; it is completely neutral.

An additional type of statement that we provide is the weighting of the different concepts, and thus the terms. This is a relatively untried device that appears to have the possibility of being a particularly powerful tool in improving the relevance ratio. If one is doing intellectual indexing, it seems reasonable to suggest that the weighted indexing should also be a subjective assessment. If the indexing is to be done by using statistical techniques, then obviously the assignment of weights is a ready by-product.

If the impact on recall and relevance of the various devices is to be isolated, we cannot afford to have variations in other factors introducing uncontrolled influences. We cannot afford a situation, for example, where the figures for the effect of a particular device are criticized as unreliable because the indexer had omitted some vital term or relation. In particular, we want to be sure that all the relevant documents can be retrieved when indexing is exhaustive and specific, i.e. all the facilities indexwise must be available for complete retrieval from the index language (remembering that complete retrieval is always available to any librarian if he is prepared to abandon his index language and search the whole collection). This will be ensured by checking the indexing of a document against the questions to which it is known to be relevant and making quite sure that the raw indexing material does have this necessary data.

It is an implicit assumption of the provisions we intend to make for indexing that the ability of any index language to describe a subject closely or precisely is crucial if a high relevance ratio is required. If the index language (its vocabulary and its syntax) does not allow precise description, then the most exhaustive and specific searching will not improve matters in this respect. It is interesting to note that the age-old arguments about whether a classification should be detailed or not now has the basic issue determined with reasonable precision. While a detailed classification will provide precision for those who need it, but can be used broadly by those who do not, a broad classification provides facilities only for the second eventuality. At the same time, it is possible that the surprising degree of correspondence in the recall performance of the four different systems in Cranfield I can be attributed largely to the care with which the vocabulary was established in each case, even though the syntax of the schemes varied considerably. It should be noted, however, that the presence or absence of provision for the display of relations will, in certain circumstances, have the same effect on recall and relevance as the presence or absence of provision for vocabulary terms, e.g. a search for *x as an agent* will not be retrieved independently of *x as a patient* unless the index language allows the difference in role to be indicated.

Earlier in this paper, we suggested that the subject area covered by an indexing system might prove to be the most potent factor of all in determining a performance curve. We hope to be able to shed some light on this by testing an index in the field of the social sciences, where we may find that the potency of particular devices will vary significantly from their potency in a relatively unambiguous area like high speed aerodynamics.

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Letter to the Editor

MONITORING CURRENT TECHNICAL INFORMATION

Dear Madam,

I agree with Mr Cemach that a discussion on the points he raises* would be useful. Perhaps I may be allowed to take issue with him by suggesting that it is not altogether helpful to attempt a comparative evaluation of services and index structures which serve differing purposes. These purposes determine the priorities in each case. Abstracts give more information in depth about fewer items than are recorded in general indexes, and the information in depth takes longer to prepare and publish. Because they are intended for perusal, subject index signposting occupies a comparatively low place in their scheme of priorities. The abstract itself is the thing.

Indexes are useful in the following circumstances: (1) The inquirer does not need an abstract—he simply wants to locate a specific piece of information. (2) He would be glad of an abstract—but because of the necessarily intangible criteria for inclusion, sometimes based on value judgments, such as those mentioned by Mr Cemach, is not certain that the item has been or will be abstracted. (3) He would be glad of an abstract—but cannot wait for its appearance. (4) He would be glad to see an abstract which he suspects has been published, but he has not the time for sequential searching, nor can he wait for the subject index to the abstracts.

These are the considerations which lead the BTI to attach importance first to currency of entries, and secondly to objective and easily understood criteria in determining selection of material for inclusion.

The two basic index structures, single sequence alphabetical and subject grouped plus alphabetical index, surely spring from the need for optimum facilities for specific subject search and broad field survey respectively. As to the danger of falling between two stools, one need only note the virtual disappearance of the alphabetico-classified form of index.

Yours faithfully,

E. J. COATES,

Editor, British Technology Index

The Library Association,
Argyle House, 29-31 Euston Road, London NW1
26th March 1963

* *Aslib Proceedings*, vol. 15, no. 3, March 1963, p. 91-2.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 5 Stratton Close, Hounslow. Hounslow 6954.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Roumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

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ence, preferably in a Special Library concerned with the fields of biology or agriculture. Some knowledge of languages useful. Salary according to qualifications and experience in a scale rising to £1,082 per annum. Five-day week. Superannuation. Apply to the Director, 56 Queen's Gate, London SW7.

THE TECHNICAL INFORMATION and Library Department of Smith and Nephew Research Ltd wish to fill a vacancy for a Technical Assistant. The successful candidate will have at least a general science degree or its equivalent, with a leaning towards physics and chemistry. The main duties will be abstracting, indexing and bibliographical work and experience in some aspects of this kind of work is necessary. Preference will be given to applicants (male or female) under 40 years and salary will be according to age, qualifications and experience. The Company's premises are near Harlow New Town and conditions of service compare well with the best industrial practice. Write brief details of age, qualifications and experience to: Administration Manager, Smith and Nephew Research Ltd, Hunsdon Laboratories, Ware, Herts.

Aslib Proceedings

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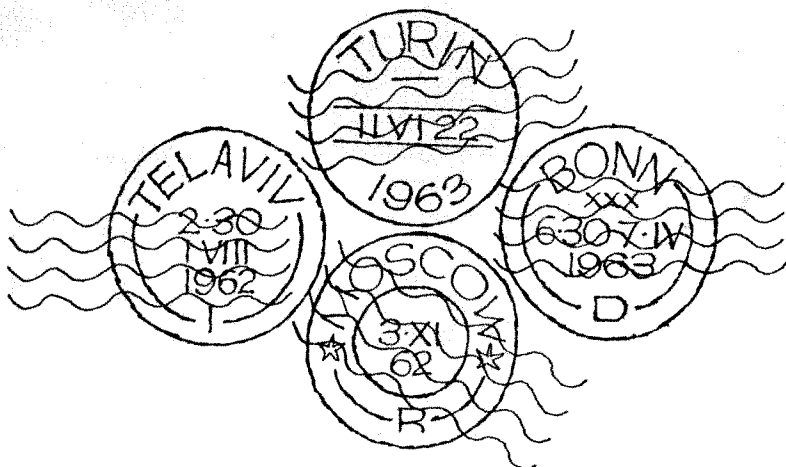
*The British National Film Catalogue and its Contribution
to Information Work*

BERNARD CHIBNALL

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. vol.15 no.5 p.135-150 London, May 1963

YOU PROBABLY HAVEN'T SEEN A MAN CALLED KAZIMIR MICHALSKI



Come to that, you probably haven't seen Conchita Camero, Joachim Winckelmann, or Henrietta Käß. (Not to mention Hertha Glöckl, Lieselotte Steckel or Hans Peter Hansen.) You would have to go behind scenes

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WHO DOESN'T ALWAYS FEEL LIKE IT EITHER

BLACKWELL'S, BROAD STREET, OXFORD.

ASLIB PROCEEDINGS

incorporating Aslib Information



Volume 15

May 1963

Number 5

ASLIB CALENDAR 1963

May

TUE.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'From Patent Office Library to National Reference Library of Science and Invention', by Miss M. Webb, Head of the Patent Office Library. Chairman, Mr E. M. Nicholson, the Director General of The Nature Conservancy.

WED.22. Film Production Librarians Group visit to 'Technicolor'.

WED.22 - THUR.23. 'Crossing the frontiers', course on the acquisition of literature from overseas.

June

TUE.4 - FRI.7. Repeat of junior introductory course to special library and information work.

TUE.11. Annual General Meeting at Aslib, 12 noon.

FRI.14 - SUN.16. Electronics Group Annual Conference at Ashridge College.

TUE.18 - FRI.21. Course on film librarianship.

WED.26 - FRI.28. Course on photographic copying in the information department. See paragraph below.

September

TUE.24 - THUR.26. 37th Annual Conference at St Andrews.

Aslib 37th Annual Conference

May we remind members that the closing date for applications to attend the Annual Conference at St Andrews is *Friday 31st May*.

Midlands Branch

The officers and committee for 1963-4 were elected at the Annual General Meeting in Birmingham on 25th March, and are as follows. Officers: Chairman, Mr A. Nicholls; Vice-Chairman, Miss D. R. Dawson; Hon. Secretary, Mr J. H. Seals; Hon. Treasurer, Mr C. P. Auger. Committee: Mr R. G. Astbury, Mr J. L. Atkins, Mrs E. R. Branson, Mr J. H. L. Bridgewater, Mr B. C. Burrows, Miss K. Mallalieu, Mr D. F. Reardon, Mrs S. M. T. Stone, Mr D. P. Woodworth.

Northern Branch

The Annual General Meeting was held on 22nd February, in Sheffield, and the following were elected as officers and committee for 1963-4. Officers: Chairman, Mr J. A. Bolton-Allen; Vice-Chairman, Mr L. Taylor; Hon. Treasurer, Mr F. Newby; Hon. Secretary, Miss E. Boddy. Committee: Mr A. R. Cameron, Mr W. Cauldwell, Miss I. M. Davidson, Miss I. M. Forsyth, Mr A. Johnson, Mr A. B. Jordan, Mr F. L. Pearson, Mr R. Sewell, Miss E. Vallender; and as *ex officio* members, Mr D. V. Arnold, Mr G. H. Davison, Mr L. G. Tootell.

At the afternoon session Mr E. T. Sara of the United Steel Companies Limited and Mr Michael Barratt-Brown of Sheffield University conducted a debate on the European Common Market.

Aeronautical Group

The twelfth Annual Conference of the Group, held jointly with the Engineering Group, was attended by sixty-eight members. The quality of the papers was very high, that by Mr M. Day on 'Local access to the aerospace literature' being particularly informative. The Aeronautical Research Council Committees and their function were admirably described by Mr A. Chinneck. Mr F. B. Roberts stimulated discussion on periodicals—size, contents lists, advertisements—and Mr C. Gibbs-Smith amused his audience with an account of the efforts of some professional authors to write aeronautical history. Mr J. Mills explained what was being done by the Aslib Cranfield Project in its investigation of indexing systems, and Mr K. Smith treated the subject of the Eldo satellite launching vehicle in a manner appropriate to the level of his audience.

The election of the committee took place at the Annual General Meeting. The officers of the committee were re-elected, and are: Chairman, Mr R. C. Wright; Treasurer, Mr J. S. Rosser; Secretary, Miss M. Dyke. There was a discussion at the Annual General Meeting on the possibility of strengthening the industrial and government representation on the committee.

Chemical Group

The Annual General Meeting of the Chemical Group was held on Wednesday 3rd April at 3 Belgrave Square. The guest speaker was Mr Harold Hodge,

Manager of the Market Research and Development Division of the Chemicals Department of Esso Petroleum Company Limited, who gave a most interesting talk on 'The role of market research in the UK chemical industry'.

The officers and committee appointed for 1963-4 are as follows: Chairman, Mr E. F. Broome; Hon. Secretary, Mrs M. H. Meiklejohn; Hon. Treasurer, Miss M. Hocking; Committee, Miss B. Newton, Dr D. J. Campbell, Mr J. G. Hall, Mr J. A. Hanson.

New members to the Group will be welcomed. They should, in the first instance, apply to the Liaison Officer, Aslib. Members who have any suggestions for future activities of the Group should get in touch with the Hon. Secretary at the following address: Distillers Company Ltd, Great Burgh, Epsom, Surrey (telephone: Burgh Heath 3470).

Electronics Group Annual Conference

The fifth Annual Conference of the Electronics Group will be held at Ashridge College, Berkhamsted, Hertfordshire, from Friday 14th June to Sunday 16th June. Sessions will include the Group Annual General Meeting, and papers on information retrieval and the history of electronics literature. Copies of the programme and application forms may be obtained from Mr R. S. Lawrie, Chief Librarian, Sperry Gyroscope Co., Bracknell, Berkshire. The closing date for the receipt of applications to attend the conference is Monday 27th May.

Photographic Copying in the Information Department

A course intended for library and information assistants engaged on photocopying work will be held by Aslib from 26th to 28th June. In addition to receiving an introduction to the basic principles of photographic copying, students will be given a chance to see and discuss a wide range of the most up-to-date equipment, and to use it under instruction. The course will be held partly at the South-East Essex Technical College and School of Art, Dagenham, and partly at Aslib Headquarters, and there will be visits to manufacturers' showrooms. The fee for the course will be five guineas. A full programme is enclosed in this issue, and applications to attend should be made to Aslib on the form provided. As numbers are to be strictly limited, students are advised to apply early. Provisional bookings will be accepted by telephone or Telex.

Documentation and Copyright Law

A four-day Institute on Documentation and Copyright Law is to take place at the Center for Technology and Administration of the American University in Washington, DC, from 20th to 24th May. The problems of copyright law raised by the increasing use of photocopying and other reproduction methods will be explored, and reports will be presented by attorneys, librarians, documentalists, scientists, and others. Requests for further information should be made to Dr Lowell H. Hattery, Director, Center for Technology and Administration, The American University, 1901 F Street, NW, Washington 6, DC, USA.

Automatic Document Analysis

A NATO advanced study institute on automatic document analysis is to be held in Venice from 7th to 20th July. Lectures will be given in English or French and the speakers will include Professor C.N. Mooers from the United States, Professor R.M. Needham from the United Kingdom, and Professor A. Leroy (representing Euratom). This information is given as a matter of general interest. The closing date for applications to attend the institute was 15th April, but details were received after the April issue of *Aslib Proceedings* had gone to press.

Anyone who is interested in further information is advised to write to the Scientific Director of the course, Professor Aldo Ghizzetti, Director, Istituto Nazionale per le Applicazioni del Calcolo, 7 Piazzale delle Scienze, Rome, Italy.

Chicago Graduate Library School

The twenty-eighth Annual Conference of the Graduate Library School of the University of Chicago will take place from 5th to 7th August. The theme will be 'Library catalogs: changing dimensions'. There will be nine sessions, which will include papers by Mr Felix Reichmann, Assistant Director of Cornell University Library, on 'The catalog in European libraries', and by Dr Frank B. Rogers, Director of the National Library of Medicine, on the 'Relation of library catalogs to abstracting and indexing services'. Details of the Conference may be obtained from Ruth French Strout, Director of the Conference, at the University of Chicago Graduate Library School, Chicago 37, Illinois, USA.

International Advisory Committee on Bibliography, Documentation and Terminology

From 11th to 15th March a meeting was held of the Unesco International Advisory Committee on Bibliography, Documentation and Terminology. It was attended by delegates from ten countries and discussed the Unesco programme for 1965-6 and a number of recommendations for the expenditure of funds in 1963-4. These included projects for the establishment of a regional documentation centre in Cairo and a further study on professional training for librarians and documentalists. Further information is available from the Aslib Library and a report of the meeting will be published in *Bibliography, Documentation, Terminology* (Unesco).

Certificate of the Institute of Information Scientists

The first Certificates of the Institute have been awarded to the following candidates who passed the Part II examinations last December: Miss D. A. Lovett, Mr J. Hill, Mr R. H. Howe and Mr D. A. Shimmield. The Part II examinations will be held again on 10th and 11th June. In accordance with the details of courses, as published in the April *Aslib Proceedings*, future examinations will be held in June each year.

Council for Microphotography and Document Reproduction

The Council for Microphotography and Document Reproduction has now been in existence for over a year and has issued its first annual report. The Council appointed an Executive Committee and there are sub-committees on Membership, Publications, Copyright, and Research. Aslib is represented on the Executive Committee by Mr Leslie Wilson, Director of Aslib. Speakers at meetings during 1962 included Mr R. A. Fairthorne of the Royal Aircraft Establishment and Mr C. J. Duncan of the Department of Photography and Printing, King's College, Newcastle upon Tyne. Three publications were brought out: *Directory of British photoreproduction services, 1962* *Review of equipment for microtext*, and volume 1 of *Microdoc*. The Research sub-committee met during 1962 and envisages a study of standards (in which liaison would be maintained with the British Standards Institution) and dealing with inquiries to the Council on equipment, materials, and products in the Council's field of interest. Information about the Council may be obtained from the Executive Secretary, Mr A. G. Howard, c/o The Library Association, Chaucer House, Malet Place, London WC1.

Guide to the Universal Decimal Classification

Guide to the Universal Decimal Classification (UDC) (British Standards Institution, 1963. Price 15s. BS 1000 C: 1963). This small handy and well-printed volume is a welcome addition to the BS 1000 series published by BSI on UDC. It may do much to encourage small libraries to use UDC. There are three sections: first, an admirably lucid introduction by Mr Jack Mills; second, an outline of the UDC schedules; and third, a list of some UDC users. An alphabetical index to the schedules is not included and might be worth publishing as a supplement; meanwhile, the Index to the Abridged Edition (BS 1000 A), price 55s, could be used, but this is an expensive index to a 15s publication. It is, of course, fair to say that this guide is not intended as a substitute for the abridged or full schedules. Copies may be obtained from the BSI Sales Branch, 2 Park Street, London W1.

Glossary of Building Terms

The British Standards Institution has recently published a new *Glossary of general building terms* (BS 3589). This is the latest standard to be published in a series of sectional glossaries for the building industry, covering such fields as modular co-ordination, iron and steel, timber, and solid fuel appliances. All these sections will eventually be combined into a comprehensive building glossary. Copies of BS 3589 may be obtained from the BSI Sales Branch, 2 Park Street, London W1, price 7s 6d each. (Postage will be charged extra to non-subscribers.)

Supplement to Chemical Abstracts List of Periodicals

The Chemical Abstracts Service is reprinting the 1962 Supplement to the 1961 *Chemical Abstracts List of Periodicals*. This supplement lists the periodicals and

serials added during the past year to those regularly scanned by CA staff for abstracting and inclusion in *Chemical Abstracts*. All journals are listed in alphabetical order with the frequency of publication and the addresses of the publishers given. Copies can be purchased for \$2 a copy from the American Chemical Society, Special Issues Sales, 1155 Sixteenth Street, NW, Washington 6, DC. The 1961 *List* is still available at \$5 a copy.

Ergonomics for Industry

This is the title of a new series of booklets issued by the Department of Scientific and Industrial Research. Number 1 in the series, 'The industrial use of ergonomics', by W. T. Singleton, was published at the end of 1962, and examples of forthcoming titles are 'Instruments and people' (number 2) and 'Noise in industry' (number 6). Copies are available free of charge to research associations and similar bodies, including Aslib, and their members; requests for copies should be made to the DSIR Warren Spring Laboratory, Stevenage, Hertfordshire.

London International Engineering Exhibition

By courtesy of the Department of Scientific and Industrial Research, Aslib participated in the London International Engineering Exhibition held at Earls Court in April. A small stand was made available on the main DSIR stand, and considerable interest was shown in the exhibit by both home and overseas visitors.

Literature of Librarianship read by Special Librarians

This was the subject of an investigation made at the 1962 Aslib annual conference at Blackpool, and a number of members have expressed their interest in the results. They may like to know that a survey of the results will be published in the June 1963 issue of the *Journal of Documentation*.

IPEX 63

The eleventh International Printing Machinery and Allied Trades Exhibition, IPEX 63, will open in London on 16th July and close on 27th July. It is expected to be the largest of its kind ever held in this country by a single industry and will occupy both Olympia and Earls Court. A special feature will be 'Printing and the mind of man' which will comprise two historical exhibitions, one in the King's Library of the British Museum, where books of typographical beauty and value from the fifteenth to the twentieth centuries will be on display; and one at Earls Court, showing printing equipment and materials since the fifteenth century, and books illustrating the impact of printing on the mind of man. Requests for information about IPEX should be addressed to F. W. Bridges & Sons Ltd, Grand Buildings, Trafalgar Square, London WC2 (telephone Whitehall 0568).

THE BRITISH NATIONAL FILM CATALOGUE AND ITS CONTRIBUTION TO INFORMATION WORK

BERNARD CHIBNALL, B.SC.

Editor, British National Film Catalogue

Evening meeting, London, 21st March 1963

THE present state of film information is nothing short of chaotic. Individual organizations do sometimes keep records of films in their own fields of interest and occasionally publish these lists. The Educational Foundation for Visual Aids has catalogues of films of use in direct teaching; the Royal Institute of Chemistry has published a list of films on chemistry; the Scientific Film Association has published many catalogues on different subjects but these are restricted—because the Association lacks funds—to subjects on which another body is prepared to spend money. The British Film Institute has extensive records but these exist only in the form of its own card indexes and are available only at the Institute's premises. If information is to be wholly useful, it must be freely available and known to be available. The haphazard nature of current sources of film information makes it extremely difficult for the outsider to use them.

There are of course many film catalogues—as many as six hundred, according to a recent issue of *Film User*—but these are arranged by distributor and anyone interested in particular subjects may need to study as many as a hundred catalogues. Besides, not all distributors send out copies of new editions automatically, and to keep the collection up to date is time consuming. The catalogues themselves have no common style and familiarity is required with each of them if they are to be consulted quickly.

There are reasons for this situation. The film has burst upon us in this century and we have been fully occupied developing the medium. There has been little left of the enthusiast's time for him to see how the films he has made might reach their public. Further, although the film started as a scientific instrument, its entertainment value was soon realized in the music hall, and such was the fascination of movement, colour, and finally sound that it was steady progress from three-minute quickies to full-colour, wide-screen, stereophonic sound epics. The 'film' became associated with entertainment in everyone's eyes and its purposeful uses were ignored. Indeed, the fact that films could be enjoyable, and could make learning a pleasure, detracted considerably—in some people's eyes—from their usefulness. Entertainment and

learning could not be associated. It was rather like refusing to use textbooks because they looked like detective novels. The fact that the film entertains while it informs is its great strength in study of all kinds, and behind all the ballyhoo of the cinema many pioneers have pressed on with the development of the use of the film for research, education, and mass communication.

This pressure was increasing especially just before the second world war. The rapid pace of readjustment and training which the war necessitated brought the purposeful film into its own. Few people can have avoided seeing films on one topic or another during this period, and at last the contribution that films could make in communicating information and ideas began to be realized. After the war, the use of films in industry expanded enormously; for a time the Government actively sponsored films on all aspects of its affairs, and it eventually allowed a little money to be spent on producing films for schools.

The film is an expensive medium and has need of a large distribution if its production is to be justified. Moreover, a good film is equally useful in a wide range of applications and, most important, in many countries. But if this wide distribution is to be achieved, there must be some co-operation between the sponsors and the potential users. Co-operation between different groups could be engendered relatively easily during the war when the common purpose was clear for all to see. The post-war period, perhaps naturally, seems to have encouraged a more individualistic approach to our problems with the result that co-operation between different groups has been more difficult and the production of good films has suffered accordingly. The lack of widely available information on films has also contributed to this problem. Some subjects are duplicated whilst others are untouched; and treatments pay little attention to the needs of the audience, only to the needs of the sponsor. Since films are often distributed free of charge, borrowers are often numerous in any case, and it is easy to persuade oneself as a sponsor that they are getting what they want. Without a focal point, borrowers have no easy means of communicating with the sponsors.

Whilst audiences in film-producing countries might feel satisfied with the service the short-film industry was offering them, those in countries without the means of producing their own films became very conscious of the difficulties in the way of obtaining films. All the new countries have, through their representatives with international bodies, emphasized this problem. Necessarily, pressure was brought to bear on Unesco, and Unesco for many years attempted to produce international catalogues of film. They finally recognized that international results could only be achieved if individual countries first documented their own films. In 1960, Unesco therefore asked the International Film and Television Council, under its President Mr John Maddison, of the British Central Office of Information, to carry out an investigation into the film information available in a number of different countries. At a meeting in London in December 1960, representatives from almost all British film associations came together to report to the IFTC representative whatever information they each held on British films. As a result of this meeting it was clear that a great deal of information was being recorded, and if some means could be found to publish it a big step would be taken towards the proper

documentation of British films. With the close co-operation of the British National Bibliography, a plan was formulated. Early in 1961 a conference was organized by the Foreign Office on behalf of the Film Sub-committee of the Council of Europe, to consider the distribution of non-theatrical films. A paper was prepared for the conference by John Maddison, and soon it was apparent that wider distribution of films could only be achieved if there was first a wider distribution of information. All member countries of the Council of Europe were therefore asked, in a resolution which was passed unanimously, to prepare catalogues of their own film production. (A number of other points were also referred to in other parts of the resolution.)

With this impetus, the plan for a British catalogue proceeded and in 1962 a prospectus was circulated, with the aid of a grant from the Foreign Office, outlining the plan and seeking support for it. Sufficient promises were received for a decision to be made to go ahead and publish the catalogue; and the first issue appeared at the beginning of April 1963, giving details of films produced in Britain since 1st January 1963.

Although demand is mainly for information about non-fiction films, it was felt from an early stage that it would be extremely difficult to draw the line between some fiction and some non-fiction films. The Catalogue is therefore comprehensive and aims to include details of *all* films made in Britain of which a copy can be obtained. Any film, whether edited or not, is eligible within these terms. This means that research or record films can be included, if copies are available—this is a very important proviso. It is felt that more of such films will be made available if the owners know that information about them will be distributed, and the business of preparing prints justified by the consequent demand for them.

The main part of the Catalogue is a subject arrangement of non-fiction films followed by an alphabetical arrangement of fiction. The Universal Decimal Classification is used, in accordance with the terms of the Council of Europe resolution. A sample entry is shown in Figure 1. Ideally the synopses should be prepared by the cataloguer, but time would not permit this. In the circumstances, distributors' synopses must be used. It is to be hoped that the standard of some of these will improve when it is realized what purpose they serve.

Although the alphabetical section was not envisaged when the Catalogue was first conceived, it forms an important part of the final version and should be of great benefit to the film industry itself. An extract from the first issue is given in Figure 2. Detailed information about the industry is not readily obtainable, and it is felt that sponsors will be glad of the easy availability of a list of production companies and the films they have recently completed; and that production companies will find the list of technicians useful, and that students of the cinema, whether as an art or an industry, will find that this section provides them with essential basic facts.

All the information in the Catalogue entry for a film is required at one time or another, and some of it is often hard to find. It is gratifying that some sponsors have already decided to make their own data sheets conform with those of the Catalogue. In view of the existing difficulties in obtaining information, it is natural to ask if the Catalogue will be successful in overcoming them.

It is hoped that it will. The promise of early publication is a great attraction and is bringing in details of films even, in some cases, before the sponsors are ready to distribute them. In addition, the Catalogue has full access to the records of many other organizations. The most difficult films to control will be those produced privately within a company with its own resources. These are often shown only on a very limited scale, and indeed one wonders why the films were made in the first place. The indications are that easy publicity, through the Catalogue, may draw even these diffident sponsors out.

678—Macromolecular materials

678.5—Plastics

PROSPECT FOR PLASTICS

dist.: U.K.: Shell Chemical Co. and Petroleum Films Bureau, overseas: local Shell Companies (FREE) 1963. *p.c.* Shell Film Unit for Shell International Petroleum Co.

29½ mins. sd. col. 35mm. 2677ft. 16mm. 1062ft.

Language versions: English, Danish, Dutch, Finnish, French, German, Italian, Norwegian, Swedish, Spanish, Turkish, Indonesian.

Credits: *p.* Michael Clarke. *d.* Ramsay Short. *pb.* Sidney Beadle. *ed.* Alvin Bailey. *m.* Stanley Myers.

Plastics are new man-made materials based on the polymer—a long chain of molecules. They are divided into two types: thermo-setting and thermo-plastic. They have countless uses. They come in a wide variety of forms and with many different properties. Properly chosen plastics are not substitutes but better materials in their own right. But their properties must be matched to the task they are to perform.

Fiction entries are similar to the above but include details of the leading players. They are filed alphabetically.

FIGURE 1

Many people ask about the inclusion of films already in existence before the beginning of 1963. These have been deliberately excluded because the task of including them would have been quite unmanageable. In time the cumulative issues of the Catalogue will come to provide a complete record and it is important that we should keep up to date with new films. In future, films available before 1963 will, it is hoped, be included in subject catalogues, but the preparation of these must wait until the current Catalogue is firmly established. In the meantime it may well be possible to publish records of other specialized sources of information on films. A start has already been made by listing periodicals which publish film reviews. The Catalogue itself is factual and is not intended to include reviews or criticisms; it was therefore felt that it would be helpful to indicate some of the more important journals which specialize in film criticism, and a list of these is published in the first issue.

It is planned to publish the Catalogue every two months and to produce an annual cumulative volume. If there is a demand, it would be possible to produce the information on cards, as is done for the *British National Bibliography*. If this is to be undertaken, it will have to be a commercial proposition. It is hoped in

- Bailey, Alvin (*ed.*) *see*
 Prospect for plastics
 Beadle, Sidney (*ph.*) *see*
 Prospect for plastics
 Cameramen *see*
 Photographers
 Clarke, Michael (*p.*) *see*
 Prospect for plastics
 Composers *see*
 Myers, Stanley
 Directors *see*
 Short, Ramsay
 Distributors *see*
 end of alphabetical section
 (they are here listed with addresses)
 Editors *see*
 Bailey, Alvin
 Myers, Stanley (*m.*) *see*
 Prospect for plastics
 Petroleum Films Bureau (*dist.*) *see*
 Prospect for plastics
 Photographers (*ph.*) *see*
 Beadle, Sidney
 Producers *see*
 Clarke, Michael
 Production Companies *see*
 Shell Film Unit
 PROSPECT FOR PLASTICS 678.5
 Shell Chemical Co. (*dist.*) *see*
 Prospect for plastics
 Shell Film Unit (*p.c.*) *see*
 Prospect for plastics
 Shell International Petroleum Co. (*sp.*) *see*
 Prospect for plastics
 Short, Ramsay (*d.*) *see*
 Prospect for plastics
 Sponsors *see*
 Shell International Petroleum Co.

FIGURE 2

fact that the indexing will be such as to make the Catalogue self-contained. Only British films are included, but the importance of referring to new foreign films made available in this country is fully recognized. Urgent attention is being given to this problem.

The Catalogue is a co-operative venture. The organizations represented on its Board of Management include Aslib, the British Association for the Advancement of Science, the British Industrial Film Association, the British Universities Film Council, the Educational Foundation for Visual Aids, the Federation of Film Societies, the Scientific Film Association, and the Scottish Film Council.

The Catalogue has received great encouragement from all branches of the industry. By publishing film information regularly and widely it hopes not only to benefit the industry and the user but in the long run to help this remarkable medium to contribute fully to our society today.

Letters to the Editor

KEYWORD-IN-CONTEXT INDEXES

Dear Madam,

We note on p.31 of *Aslib Proceedings*, vol.15, no.1, 1963, that Messrs East, Shaw and Smith refer to what is, apparently, to them a novel use of a condensed reference as the tying code between keyword and bibliography. This has been our practice in *Chemical Titles* since January 1962. Thus, JACS-0062-4971 refers to *Journal of the American Chemical Society*, vol.62, p.4971. We prefer a four-letter code to one of three letters since it affords the possibility of covering all scientific journals (Note. 26 = 456, 976) and of giving a more mnemonic abbreviation. Shortly, the American Society for Testing Materials is to publish a reference book of some 30,000 of these four-letter codes for journals as the result of a collaborative effort between our two groups. It is hoped that this will provide a standard journal abbreviation for many purposes, especially for computer work where brevity is of paramount importance.

May I also, at the same time, correct a statement in Mr Black's paper (*Aslib Proceedings*, vol.14, no.10, 1962, pages 313-21), where he refers to *Chemical Titles* as 'a KWIC index to *Chemical Abstracts*', which it is not, and cannot be. *Chemical Titles* is an alerting service based on a keyword-in-context index and bibliography of titles of current chemical papers. Its first volume was in April 1960 (not, as stated, in 1961); its very nature precludes it being considered as an index to *Chemical Abstracts*.

The early history of *Chemical Titles* has been described by Mr Robert R. Freeman and the writer of this letter (*Journal of Chemical Documentation*, vol.3, no.1, 1963, pages 16-20).

Sincerely yours,

G. MALCOM DYSON,
Director of Research

Chemical Abstracts Service,
Research and Development Division,
Ohio State University,
Columbus 10, Ohio, USA
12th March 1963

JAPANESE transliteration

Dear Madam,

I note that the regional editors of the new Pergamon *Information Storage and Retrieval* include one Dr S. Yosioka. This gentleman is presumably Japanese. If so, his name is not Yosioka.

Let us hope that the cumulative effect of this journal and similar publications will be, firstly, to standardize the transliteration of Kana, and, secondly, to persuade the Japanese to abandon these irregular and totally inadequate 'alphabets' in their technical writings.

Yours faithfully,

JOHN B. ROSCOE

39 Letham Road,
Strathaven, Lanarkshire
13th March 1963

SELECTIONS FROM THE RECENT
LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

Books and Pamphlets

AMERICAN CHEMICAL SOCIETY. 143rd national meeting, Cincinnati, 1963

Chemical notations: a brief review [by] Howard T. Bonnett [preprint of paper presented before the Division of Chemical Literature] [Cincinnati, Ohio, 1963]. 24[2] p.

AMERICAN CHEMICAL SOCIETY. 143rd national meeting, Cincinnati, 1963

Specialized mechanized information centers, by Allen Kent [preprint of paper presented before the Division of Chemical Literature] [Cincinnati, Ohio, 1963]. 19 p.

AMERICAN INSTITUTE OF PHYSICS. Documentation Research Project

Indexing physics research papers, report prepared by Pauline Atherton. New York, 1963. Various paging. tables. diags. (Report no. AIP/DRP 63-1.)

AUSSCHUSS FÜR WIRTSCHAFTLICHE VERWALTUNG

Mikrofilm 1961: Wiedergabegüte, Verarbeitung, Wirtschaftlichkeit, Anwendungen. Stuttgart, Dorotheen-Verlag, 1962. 32 p. photos., diags.

[BARBOUR INDEX LIMITED]

Catalogue planning [by Malcolm Quantrill. London, 1962]. 32 p. 30s.

COLLISON, ROBERT L.

Library assistance to readers. [4th ed. rev. and enl.]. London, Crosby Lockwood [1963]. xviii, 139 p. plates. facsim. 15s.

CONFERENCE terminology: a manual for conference members and interpreters in English, Russian, French, Italian, Spanish, German. 2nd ed. rev. and aug. Amsterdam, London [etc.]. Elsevier, 1962. 162 p. (Glossaria interpretum. Editor: Jean Herbert.) 20s.

HALTER, P.

The Swifta Superimposable Punched Card: an efficient aid to documentation especially for professional literature. [Bottmingen, BL (Switzerland) 1962?] 10[2] p. Bibliog.

HARRISON, K. C.

The library and the community. [London] Andre Deutsch [1963]. 96 p. 12s 6d.

HATTERY, LOWELL H., and MCCORMICK, EDWARD M., eds.

Information retrieval management [adaptation of papers presented at the American University. Center for Technology and Administration. 4th Institute on Information Storage and Retrieval, 1962]. [Detroit, Michigan, American Data Processing, 1962.] 151 p. diags. bibliog. \$15.

... INTERNATIONAL Conference on Machine Translation of Languages and Applied Language Analysis: proceedings of the conference held at the National Physical Laboratory, Teddington, Middlesex, on 5th, 6th, 7th and 8th September [1961]. Vols. I-II. London, HMSO, 1962. 2v. (National Physical Laboratory symposium, no. 13.) 50s.

*KING, ALEXANDER, and FROMHERZ, HANS
German-English chemical terminology: an introduction to chemistry in English and German. 4th rev. and enl. ed. Weinheim, Verlag Chemie, 1963. xxi, 588 p.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY. Libraries
Comparison of the results of bibliographic coupling and analytic subject indexing [by] M. M. Kessler. [Cambridge, Mass.] 1963. 30 p. tables.

MELBOURNE. University. Library
Essentials of library planning, by K. A. Lodewycks. Melbourne, 1961. x, 136 p. diags. Mimeog.

MINNESOTA. University. Center for Continuation Study, and MINNESOTA. University. Library School

Information retrieval today: papers presented at the Institute . . . , September 19-22, 1962, edited by Wesley Simonton. Minneapolis, Minn., 1963. 176 p. illus. tables. diags.

PIASECKI, WLADYSLAW
Biblioteka: wprowadzenie do zagadnień budowy [An introduction to library building problems]. Warszawa, Stowarzyszenie Bibliotekarzy Polskich, 1962. 120 p. illus. diags. English summary: p. 111.

SCHUTZE, GERTRUDE
Bibliography of guides to the S-T-M literature: scientific-technical-medical. Supplement, 1958-1962. New York, 1963. 1, 38 p. mimeog. (Contributions to the S-T-M library literature, no. 2.) \$2.

SHARP, HAROLD S.
Your company library: how to use it. Milwaukee, Wisconsin, General Motors, n.d. 22 p. illus. 25c.

TOMLINSON, NORMAN
Librarianship. London, Robert Hale [1963]. 95 p. plates. 8s 6d.

UNITED STATES. Armed Services Technical Information Agency
Final report on first revision of the Thesaurus of ASTIA Descriptors . . . , prepared by Engineers' Joint Council. [Arlington, Virginia] 1962. 19 p. (AF 18 (600)-1944) (AD 278 168).

UNITED STATES. Armed Services Technical Information Agency
Language oriented retrieval systems, by Paul H. Klingbiel [Arlington, Virginia] 1962. Various paging. diags. (AD 271 600.)

UNITED STATES. Armed Services Technical Information Agency

Philosophy of and guidelines for revision of the ASTIA Thesaurus . . . [by] T. L. Gillum [and others]. Arlington, Virginia, 1961. 19 p.

UNITED STATES. Library of Congress. General Reference and Bibliography Division

International scientific organizations: a guide to their library, documentation and information services, prepared under the direction of Kathrine O. Murra. Washington, [US Govt Printing Office] 1962. xi, 794 p. \$3.25.

UNITED STATES. National Aeronautics and Space Administration
Space scientists and engineers: selected biographical and bibliographical listing, 1957-1961. . . . Washington, US Govt Printing Office, 1962. iii, 332 p. (NASA SP-5.) \$2.

UNITED STATES. National Library of Medicine
Medical subject headings: main headings and cross references used in the "Index Medicus" and the "National Library of Medicine Catalog". 2nd ed. . . . [Washington, US Govt Printing Office] 1963. x, 317 p. ("Index Medicus", vol. 4, no. 1, part 2, January 1963.) \$2.25.

WEITZEL, ROLF
Bibliographische Suchpraxis: eine Einführung [Bibliographical search practice: an introduction]. Stuttgart, C. E. Poeschel Verlag, 1962. 140 p. (Werkstatt des Buches: herausg. von Horst Kliemann und Fritz Hodeje.) DM 11.

Articles and Papers

ARNTZ, HELMUT
Ordnung: die Grundlegung der Dokumentation [Classification: the foundation of documentation]. *Nachrichten für Dokumentation*, vol. 14, no. 1, March 1963. p. 1-2.

ARNTZ, HELMUT
Problematik einer Klassifikation der Sozialwissenschaften [Difficulties of a classification of the social sciences: UDC]. *Nachrichten für Dokumentation*, vol. 14, no. 1, March 1963. p. 7-9.

BERKOWITZ, ALBERT M.
The catalog card problem: LC or 'Do-it-yourself'. *College and Research Libraries*, vol. 24, no. 2, March 1963. p. 126-30.

BONN, GEORGE S.
Science-technology periodicals: a preliminary report on a one-year use-study at NYPL [New York Public Library]. *Library Journal*, vol. 88, no. 5, 1 March, 1963. p. 954-8.

CHICOREL, MARIETTA
Trends in book prices and related fields in West Germany, 1954-1960. *Library Resources and Technical Services*, vol. 7, no. 1, Winter 1963. p. 47-56.

- COLLISON, ROBERT L.
Filing and indexing. Part 4: filing cards. *Office Magazine*, vol.10, no.112, April 1963. p.294-6, 299-301.
- CULBERTSON, DON S.
Another Tower of Babel? [proposal for a standard computer language]. *Library Journal*, vol.88, no.5, March 1 1963. p.940-3.
- ELLIOT, HERBERT E.
Xerography faces the graphic arts. *Small Offset User*, vol.12, no.137, March 1963. p.209-13.
- FOSTER, DONALD L., comp.
Notes used on music and phonorecord catalog cards. *University of Illinois Graduate School of Library Science Occasional Papers*, no.66, December 1962. 39 p.
- HAUGH, W. S.
The Working Party reports ["Standards of Public Library Service . . .", and "Inter-Library Co-operation . . .", 1962]. *Library World*, vol.LXIV, no.753, March 1963. p.231-4, 256.
- HYMAN, RICHARD J.
Wanted: a true unit card! *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.105-12.
- KELLER, DOROTHY B.
Acquisition of library materials from East Europe. *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.34-7.
- MCNIFF, PHILIP J.
Acquisition of library materials from the Middle East. *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.22-7.
- MEYER-UHLENRIED, K. H., and BERNSTEIN, HANS H.
Erfahrungen beim Einsatz von Lochstreifen zur Datenerfassung bei EURATOM [Use of punched-tape typewriters in data processing at EURATOM]. *Nachrichten für Dokumentation*, vol.14, no.1, March 1963. p.23-8.
- MODEL, FRITZ
Ordnungsverfahren in der Dokumentation und Bibliothek des Deutschen Hydrographischen Instituts [Classification procedure in documentation at the Library of the German Hydrographical Institute]. *Nachrichten für Dokumentation*, vol.14, no.1, March 1963. p.17-23.
- ORLOV, VLADIMIR N.
Report on Soviet libraries: a review. *Library Journal*, vol.88, no.4, 15 February 1963. p.724-7.
- PANOFKY, HANS E.
Acquisition of library materials from Africa. *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.38-46.
- REICHMANN, FELIX
Acquisition of library materials from South-east Asia. *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.13-21.
- RICHMOND, PHYLLIS ALLEN
A short-title catalog made with IBM tabulating equipment. *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.81-90.
- RICHMOND, PHYLLIS ALLEN
What are we looking for?: attention to the nature of scientific discovery would produce better information retrieval systems. *Science*, vol.139, no.3556, 22 February 1963. p.737-9.
- SCHICK, FRANK L.
Library science research. *Journal of Education for Librarianship*, vol.3, no.2, Fall 1962. p.83-92.
- SCHILLER, HILLEL
What is MEDLARS?: a progress report on the National Library of Medicine's new computer-based bibliographic retrieval and publication system, which is scheduled to begin compiling the "Index Medicus" by January 1964. *Library Journal*, vol.88, no.5, 1 March 1963. p.949-53.
- SHAW, RALPH R.
Classification systems. *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.113-18.
- STENMARK, HARRY
Litteraturtjänsten hos Holländska Post-, Telegraf- och Telefonförvaltningen (PTT) [Documentation activities of the Postal and Telecommunication Services (PTT) of the Netherlands]. *Tidskrift för Dokumentation*, vol.19, no.1, 1963. p.1-8.
- SYKES, J. B.
Technical translation at Harwell. *Revue Internationale de la Documentation*, vol.30, no.1, February 1963. p.2-4.
- THEOBALD, H. RUPERT
Mechanical reproduction of library cards in a special library. *Special Libraries*, vol.54, no.3, March 1963. p.143-6.
- TSUNEISHI, WARREN M.
Acquisition of library materials from China, Japan and Korea. *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.28-33.
- VDOVIN, GEORGE, and others
Computer processing of serial records. *Library Resources and Technical Services*, vol.7, no.1, Winter 1963. p.71-80.
- VERRY, H. R.
A brief survey of the basic copying methods. *The Industrial and Commercial Photographer, Supplement*, vol.2, no.11, March 1963. p.xiv-xv.
- VERRY, H. R., ed.
Document reproduction. *Revue Internationale de la Documentation*, vol.30, no.1, February 1963. p.31-4.

VOLLANS, ROBERT F.

Twelve years after: library co-operation in 1963. *Library World*, vol. LXIV, no. 753, March 1963. p. 235-40.

WILKINSON, W. A.

A machine-produced book catalog: why, how and what next? *Special Libraries*, vol. 54, no. 3, March 1963. p. 137-43.

WILSON, LESLIE

Der gegenwärtige Stand und die Entwicklungstendenzen der Informationsdienste im Vereinigten Königreich England, Schottland, Nordirland [the current situation and trends in the development of information services in the United Kingdom]. *Nachrichten für Dokumentation*, vol. 14, no. 1, March 1963. p. 34-8.

With reference to the advertisement published by Anbar Documentation Service on page vi of the March 1963 issue Mr R. Moss asks us to say that he has no connection with this Service and that the advertisement was published without his prior knowledge. The quotations given were not an accurate copy of what was published in the original article.

MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 5 Stratton Close, Hounslow. Hounslow 6954.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Roumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

ACCURATE technical and commercial translations from German and French by a qualified and experienced scientist, Fellow of the Institute of Linguists and Member of the Translators' Guild. 2a Holland Park, London W11.

Appointments vacant

BRITISH MUSEUM. Research Assistants. Five pensionable posts in Department of Printed Books, for work for National Reference Library of Science and Invention, for men or women graduates at least 20 on 1st May 1963. Final-year students may apply. Two posts require degree in science, the others a good knowledge of two modern languages. Library experience or qualifications an advantage for all posts. Inner London salary scales £635-£1,113 or £1,224-£1,491 according to age, qualifications, and experience. Starting salary up to £913 (at age 26) on lower scale. Promotion prospects. Write Civil Service Commission, Burlington Gardens, London W1, for application form, quoting 5677/63. Closing date 24th May 1963.

HOUSE OF COMMONS. Library Clerks. Two pensionable posts for 1st or 2nd class honours graduates (men or women) under 26 on 1st May 1963. (Age extension for Forces service.) For one post the degree must be in subjects which include statistics, preferably combined with economics. For the other post, library qualifications or experience (especially of cataloguing), and thorough knowledge of one or more modern languages would be advantages. Final-year students may apply. Salary scale £812-£1,331, plus £195 night-duty allowance (where applicable); starting salary may be above minimum. Promotion prospects, at about 30, to scale £1,456-£2,472. Write Civil Service Commission, Burlington Gardens, London W1, for application form, quoting 5672/63/14. Closing date 24th May 1963.

LIBRARY specializing in electrical engineering and allied subjects requires well-educated female assistant to take charge of service to members. Age preferably 19-25 but older applicants will be welcomed. Candidate with part(s) of the Registration Examination of the Library Association and previous library experience preferred. Encouragement given to increase knowledge of librarianship. Salary according to age and experience in the range £465-£725. Applications to the Personnel Officer, Electrical Research Association, Cleeve Road, Leatherhead, Surrey.

For sale

JOURNAL of the Institute of Metals (with Bulletin and indexes) and *Abstracts of the Institute*, 1934-60. Bound. Box 563, Aslib.

Aslib Proceedings

incorporating Aslib Information

CONFERENCE ON CO-ORDINATE INDEXING SYSTEMS

*The Mechanics of Co-ordinate Indexing and its Relation to
other Indexing Methods*

J.L. JOLLEY

Vocabularies for Co-ordinate Systems

B.C. VICKERY

Practical Application of Feature Card Systems

G.M. BOYD

S.B. CHILDS

A. JOHNSON

DAVID G. SHEDDEN

ASLIB • 3 BELGRAVE SQUARE • LONDON SW1

Aslib Proc. vol.15 no.6 p.151-200 London, June 1963

when is an ant not an ant?

You could say that a certain bookshop in Oxford

BLACKWELL'S—(AS IF YOU HADN'T GUESSED!)

is like an ant hill. Active. Well organised. Full of workers doing their own special job in one of the many departments—and doing it hard. But there's a difference

A VERY BLACKWELL-LIKE DIFFERENCE.

In spite of the ant-like qualities, this place contrives to be human. Very human. It believes that a bookshop can be big and busy and well-organised—(probably bigger, busier, better organised than any others you can think of)—and still stay as human and friendly as a village shop.

THAT'S BLACKWELL'S ALL OVER.

To them, every customer is an important individual; and every order must be treated with special care. Doesn't matter whether it's big or small—it's made to feel important.

AT BLACKWELL'S.

Right now, if you were to ring Oxford 49111

YOU'D FIND JULIAN BLACKWELL

CRAWLING ROUND AND ROUND THE TELEPHONE—

JUST WAITING TO HEAR FROM YOU!

REALLY!



BLACKWELL'S, BROAD STREET, OXFORD.

ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 15

June 1963

Number 6

ASLIB CALENDAR 1963

June

TUE.18 - FRI.21. Course on film librarianship.

WED.26 - FRI.28. Course on photographic copying in the information department.

September

THUR.12. Technical Translation Group meeting at Aslib, 3.30 for 4 p.m. 'Alphabets of difficult languages', by R. Sewell.

TUE.24 - THUR.26. 37th Annual Conference at St Andrews.

October

TUE.15. Chemical Group sherry party at Aslib.

TUE.22. Evening meeting at Aslib, 5 for 5.30 p.m.

November

THUR.7. Technical Translation Group sherry party at Aslib.

THUR.21. Evening meeting at Aslib, 5 for 5.30 p.m.

Handbook of special librarianship

The second edition of the Aslib *Handbook of special librarianship and information work*, which was published in the spring of 1962, rapidly went out of print and has now been reprinted. A leaflet announcing it is enclosed with this issue of *Aslib Proceedings*. The *Handbook* is available from Aslib, price 50s to members and bona fide students and 63s to others. (Students who wish to make use of the special membership price should state the address of their library school or college when ordering.)

Textile Group

The Annual General Meeting of the Textile Group was held at the Hosiery and Allied Trades Research Association (HATRA), Nottingham, on 23rd April. Thirteen members attended. After the business meeting, a talk was given by Mr Duke-Williams of the Association on 'Liaison and education in HATRA'. After lunch the meeting was transferred to the Lace Research Association, where an extremely interesting tour was made of the main department which houses three lace frames (lace furnishing, bobinet and leavers). These were seen in operation and explained in some detail. At the business meeting, Mr W. R. Evans (Lace Research) was elected Chairman of the Group in succession to Mr Ashworth, and Mrs M. I. Lomax (Tootal Broadhurst Lee Co., Ltd) was re-elected Secretary.

The Language Barrier

The Aslib Technical Translation Group would like to encourage members of Aslib, many of whom will have some interest in technical translation, to join the Group or to subscribe to its *Bulletin*. The Group's purpose is to serve all those members of Aslib who have to do with foreign languages. Those who cannot regularly attend the London meetings of the Group, or those with a 'fringe' interest in languages, are encouraged to take the *Aslib Technical Translation Bulletin*. The *Bulletin* serves a particularly useful purpose in helping people who cannot easily get to Group meetings (which are in any case reported in it), and the editors are also anxious to make the value and interest of the *Bulletin* as widely known to members of Aslib as possible.

Each issue contains Group News, a Group Diary and usually the full text of papers presented at the Group meetings. Recent papers have been 'Language specialization in London libraries', 'Tools of the (translator's) trade', 'The Scandinavian languages' and 'BBC language courses'. Two valuable features of the *Bulletin* are the *Bibliography Section*, which lists recent dictionaries and books on languages, and the *Terminology Section*.

The commonest bugbear of the translator is the word which is not in the dictionary. This problem is naturally even more acute in technical translating, where new words are coined, and new meanings assigned to old ones, too quickly for dictionaries to keep up with them. Some purists are inclined to assert that the good technical translator should not need a dictionary, and this may be true as an ideal to be striven for; but they should remember that there are translators who are only beginners, and that even among experienced

translators there is such a shortage that they are often called upon to tackle subjects outside their own specialities. If dictionaries, word lists and glossaries will make it easier to increase the number of competent practising technical translators, then they should be encouraged.

The Aslib *Technical Translation Bulletin* is trying to help by the inclusion of a *Terminology Section* in every issue. This is compiled chiefly by experts, some of whom may even be in the non-dictionary-using class, and records new meanings, which are not given in dictionaries, but which have been deduced from the context. Readers' comments are published in subsequent issues, and it is hoped that the results of this work will later be collated. The next stage may be to call meetings of translators in a certain field, to agree on the meanings given. It would then be a simple matter to publish a glossary of new terms on the subject concerned; this would later be available to lexicographers and could be included in future editions of technical dictionaries. For example, the list of German terms on iron and steel and related subjects in the *Bulletin* for March 1963 had previously been discussed by translators connected with the British Iron and Steel Industry Translation Service: many doubts were then resolved, although a few question marks still remain. Another possibility, for those who record their new terms in a card index, is to publish the list in card form, and this is also under consideration. The terminology section usually includes notes on matters of interest to translators, giving details of technical glossaries forming part of larger publications (glossaries published separately are listed in the *Bibliography Section* of the *Bulletin*).

The current issue (volume 9, no. 1) contains a list of Russian terms on iron and steel manufacture, which it is hoped to use as the basis for a terminological working party to be convened later in the year. There is also the usual collection of terms, including technical, medical and sociological ones; and some well-known Madison Avenue slogans translated into Latin.

The editors hope that many members of Aslib will join the Technical Translation Group and subscribe to the *Bulletin*, whose value will naturally be enhanced as the number of readers increases. Membership of the Group (which costs nothing) entitles members to receive the *Technical Translation Bulletin* at a special yearly subscription rate of 20s. The *Bulletin* is available to other members of Aslib for a yearly subscription of 30s.

International Congress on Scientific and Technical Documentation and Information

The Comitato Nazionale Produttività (CNP) is organizing an international congress and exhibition on documentation and information centres, to be held in Rome from 2nd-11th February 1964. Official reports will include 'Co-operation in the field of documentation and information' by Dr Alexander King, and 'Establishment and structure of the documentation agency or body', by Professor E. Pietsch. The languages of the Congress will be Italian, French and English. Papers are invited on the following subjects: (1) *a* Linguistics and terminology, classification, standardization; (1) *b* Libraries, specialized bibliographies, patents, specialized press, radio and television, motion pictures, conventions and exhibitions; (2) Mechanical selection, automatic information

treatment, cost of the various information methods (mechanical, automatic, etc.), mechanical translation; (3) Documentation and information centres, document expert training; (4) Co-operation experiences, mechanisms of information exchange. Papers should be submitted by 31st August.

The fee to attend the Congress is \$50 and the closing date for application is 30th September 1963. Hotel accommodation can be reserved in advance. Full details and application forms are available from Segretaria, Congresso Internazionale sulla Documentazione e l'Informazione Scientifico-Tecnica, CNP, Viale Regina Margherita 83D, Rome.

Scientific Translation and Documentation

The Institute for Theoretical Physics at the University of Innsbruck has been building up a skilled translating and abstracting service since 1954, at its Department for Translation and Documentation. The Department is now seeking new contracts, since some of its current ones are coming to an end. It prepares abstracts and translations, mainly Russian, German, and English but also in other languages. Coverage is primarily of experimental, theoretical and engineering physics; and chemistry, mathematics, biophysics and medicine. Services include the provision of translators at conferences.

Anyone who is interested in the services of the Department should write for details to Translation and Documentation Department, Institute for Theoretical Physics, University of Innsbruck, Südtirolerplatz 14/16/III, Innsbruck, Austria.

Translators' Congress

The fourth Congress of the International Federation of Translators (FIT) will be held in Dubrovnik, Yugoslavia, from 31st August to 7th September, and coincides with the tenth anniversary of the Federation. Speakers will include representatives of Unesco, and the programme includes the proclamation of the Translator's Charter which is intended to provide translators with a professional code. All inquiries about the Congress should be addressed as soon as possible to the Congress Committee of FIT, Solovljeva 22/IV, Zagreb, Yugoslavia.

Classification System for Documentation

The National Science Foundation has granted funds to the System Development Corporation at Santa Monica, California, for research aimed at establishing a computer-derived classification system for scientific documentation.

The director of the project is Mr Harold Borko. He will use a mathematical procedure involving correlating index terms on the basis of their occurrence in a body of documents and then applying factor analysis to the correlation matrix. Additional information may be obtained from Mr Borko at the Center for Research in System Development, System Development Corporation, 2500 Colorado Avenue, Santa Monica, California.

International Federation for Documentation

The General Assembly of the FID has recently approved a change in the subscriptions of individual elected associate members, from 50 *guilders* to 25

guilders. This is primarily to help those members in some areas who were finding it difficult to maintain the 50 *guilders* rate. It is hoped that the new rate will strengthen contacts between the FID and individual associate members.

Dictionary of Library Terms

Unesco has published a second edition of its multi-lingual dictionary of library terms *Vocabularium bibliotecarii*. This new edition has once again been compiled by Mr Anthony Thompson, now Secretary of the International Federation of Library Associations. Russian and Spanish have been added to the English, French, and German of the previous edition, and many new concepts have been added so that the coverage is greatly extended. Messrs E.I. Shamurih and Domingo Buonocore have collaborated in providing the Russian and Spanish terms respectively. In the main section, the equivalent terms in all five languages are arranged by the UDC, and there are indexes in all five languages. The dictionary is available from HMSO, price 28s 9d.

Bibliography of Guides to the S-T-M Literature

The first supplement to *Bibliography of guides to the S-T-M literature* has just been published. It covers the years 1858-1962 and includes 395 books, articles and papers describing the literature of science and technology, including medicine. It is available from the author, Gertrude Schutze, 801 Crotona Park North, New York 60, NY, USA, and the price is \$2.

HM Consuls List

Concessional subscription rates to reference libraries in the United Kingdom are being offered, as from June 1963, by *Her Majesty's Consuls List*. This is a privately published monthly publication containing geographically classified lists of names and locations of principal diplomatic and commercial officers of this country in all parts of the world. Distribution of the *List* was formerly restricted, but, because of recent demand for the specialized information it contains, *Her Majesty's Consuls List* has lately been made generally available by subscription from the offices of the publishers at 142 Strand, London WC2 (telephone Covent Garden 1577).

Notes and Queries

Notes and Queries has been reprinted on microcards by Microcard Editions, Inc. Series I-IV (1849-73) may be purchased for \$400, and are available separately as follows: Series I, vols. 1-12 (1849-56), \$110; Series II, vols. 1-12 (1856-61), \$110; Series III, vols. 1-12 (1862-67), \$110; Series IV, vols. 1-12 (1868-73), and indexes, \$110. Orders and requests for information should be sent to Microcard Editions, Inc., 901 Twenty-sixth Street, NW, Washington 7, DC, USA.

Books, Manuscripts and Antiquities from Ethiopia

This is the title of an exhibition to be held in the King's Library of the British Museum from 10th June to 8th July. The emphasis will be on manuscripts,

attention being paid not only to calligraphy and illumination, but also to literary importance. Examples of printing in the Ethiopic script from the fifteenth century to the present day will be on display, together with the accounts of important expeditions to Ethiopia since the sixteenth century. There will be objects of ecclesiastical art; and coins, early maps, and travellers' drawings will also be shown. The exhibition precedes the Second International Conference of Ethiopian Studies to be held at the University of Manchester from 8th-11th July.

Chemical Publications Survey

The Council of the Chemical Society has recently authorized a Publications Survey, whose objects are to study and report on needs, problems and developments in the publication of chemical information; and to recommend ways of meeting more adequately the needs both of those who publish chemical information and those who read it. The survey and its recommendations will be completed within two years and will be published.

The need for such a survey is evident from the rapidly increasing volume of chemical publication and from the lack of correlated data on the production and use of chemical publications. The survey will embrace applied chemistry as well as 'pure', and also some aspects of the bordering sciences.

As much evidence as possible is needed to make the survey of real value, and individuals and organizations having information or comment on the objects of the survey are invited to get in touch with Dr R. S. Cahn, Director of Publications Research, The Chemical Society, Burlington House, London W1.

Management Development

Three one-month courses in management development are planned at Ashridge College for the second half of 1963. There will also be a series of short courses and seminars, whose subjects include 'Management in the smaller enterprise', 'New developments in personnel management', and 'Management techniques appreciation'. Further details and a copy of the current illustrated prospectus can be obtained from the Principal, Ashridge College, Berkhamsted, Hertfordshire (telephone Little Gaddesden 3191).

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CONFERENCE ON CO-ORDINATE INDEXING SYSTEMS

London, 14th March 1963

MR RAYMOND A. WALL, Librarian and Information Officer at the National Coal Board, Coal Research Establishment, took the chair. In opening the meeting, he said the time was regarded as particularly appropriate to hold a conference on co-ordinate indexing systems, because the Aslib Cranfield Research Project, now at an advanced stage, provided some interesting comparative data. As in all Aslib meetings, the present aim was to promote understanding and stimulate discussion, in order to generate new ideas.

Morning session

In introducing the first speaker, Mr J. L. Jolley, the Chairman remarked that the posts Mr Jolley had held since leaving the Army in 1947 had a common theme: the seeking of a simple pattern in rather tangled material. He had spent some years in public relations posts, working on simplification and presentation of information; then he had become interested in the statistical aspects of co-ordinate indexing on feature cards, and had formed his present company in 1958. Mr Jolley had a specialized knowledge of statistics, and his interests were linked with this, although he was now concerned with both the statistical and the semantic aspects of indexing.

THE MECHANICS OF CO-ORDINATE INDEXING AND ITS RELATION TO OTHER INDEXING METHODS*

J. L. JOLLEY, M.A., B.SC.(ECON.)

J.L. Jolley & Partners

Co-ordinate Indexing Conference, London, 14th March 1963

CO-ORDINATE (sometimes called synthetic) indexing was in use for many years before it gained its present names. It had no name at all: it was simply the way people went about answering certain sorts of question. It was used in accountancy, quality control, staff placement, medical record keeping, and municipal housing management—to take examples at random. It consisted, and it still consists, in collecting an appropriate set of items and recording their features in a standard language, usually a code, on suitable data vehicles, usually cards. Each card represented an item, and was marked with coloured tabs, or punched with holes, or clipped around its edges, the tabs or holes or notches showing which features the item possessed. All items possessing any given set of features then became easy to find. One looked—one still looks—for the right set of tabs or notches or holes.

Cards of this type are known as item cards, and most co-ordinate indexes are still embodied in them. There is, however, an alternative: instead of one card per item, an index may employ one card per feature. Such cards are feature cards. When a co-ordinate index is embodied in feature cards, the holes or other marks in or on the cards represent items.

Outside the field of documentation most items are autologues—that is, they are concerned with themselves. The features which describe them are known as descriptors. Documents, however, are concerned with something other than themselves: they have subject-matter. Features referring to subject-matter are known as terms. Feature cards are sometimes known as term cards for this reason.

For the full description of documents, both descriptors and terms are needed. The descriptors apply to the document as an object: they refer to its author, its publisher, its editorial treatment, the language in which it is written, and similar matters. The terms refer to its topics. A document may have several of these: a substantive topic may be defined as a topic describable in existing terms without the risk of crossovers (false drops in item card language).

The terms describing a topic may refer to things or to their characteristics: items and features again, in a new disguise. Confusion would reign if the words 'item' and 'feature' were used both at indexing and at textual level, so new names must be found. We may find it convenient to talk about entities and attributes.

* As originally written, this paper was designed for use with visual aids which cannot easily be reproduced on paper. It has therefore been rewritten for publication. The author offers his apologies to those who attended the conference and hopes they will recognize the old face under the new disguise.

The behaviour of entities and attributes at textual level is the same as that of items and features at indexing level; for this reason the study of each level helps the study of the other.

To complete the picture, a third level must be mentioned, more abstract and general than the remainder. At this level we deal with information matrices without considering whether their components are to represent items or features. An information matrix can be shown as a network of rows and columns to which specific meanings have not been allotted. One of its dimensions—whichever one interests the inquirer—consists of orthophores, bearers (of meaning, understood) lying in one direction. The other dimension consists of diaphores. All we postulate is that orthophores are to carry meanings of one type, whichever type that is, and that diaphores are to bear meanings of another. This removes the danger of biased thinking which arises because, at the level of indexing, our language makes us talk of items possessing features but not of features possessing items. 'Bill possesses the quality of curiosity' sounds reasonable; but 'curiosity possesses the person of Bill' is a turn of phrase commonly restricted to poets and imaginative story-tellers. We can learn from them.

Already we have collected a formidable array of technical terms, arranged on three levels—that of information theory, that of indexing, and that of textual matter. If we now start at the top and work down, it will be possible to see how each level adds restrictions to the one preceding it, and in so doing brings it closer to specific practical experience.

We may begin, then, with two orthophores—two parallel strips from an information matrix—distinguished from each other only by their position relative to the blackboard or paper on which they are drawn—which does not count—and therefore not distinguished from each other at all. To make a distinction we must add a diaphore; this produces two cells, one in each place where it intersects an orthophore. Now we must distinguish one of these cells, which can be done by marking it: a round blob will do. This corresponds to a bit, a binary unit of information, beloved of those who work with computers and communications theory. The bit can be taken as positive. And so at last we know the difference between the two orthophores: one has the bit and one has not.

This introduces a sort of rudimentary significance—the difference between B and not-B—blob and no-blob. It is the difference we recognize as at the root of mutual exclusiveness.

But though we can thus give a sort of meaning to the orthophores, the meaning of the diaphore is still quite indeterminate: there is no other diaphore with which to contrast it. We must therefore add a second diaphore, and consider where to put the blobs at the intersections it, too, makes with the orthophores. We cannot copy the first diaphore, for the two would then be identical; and we cannot put one bit in the position in which the first is blank, for this would make the two diaphores mutually exclusive: they would really be the same thing, one in positive, and one in negative, disguise. So we must give the new diaphore two bits, one at each intersection. This, of course, results in giving one of the orthophores two bits as well, and the other a single bit only.

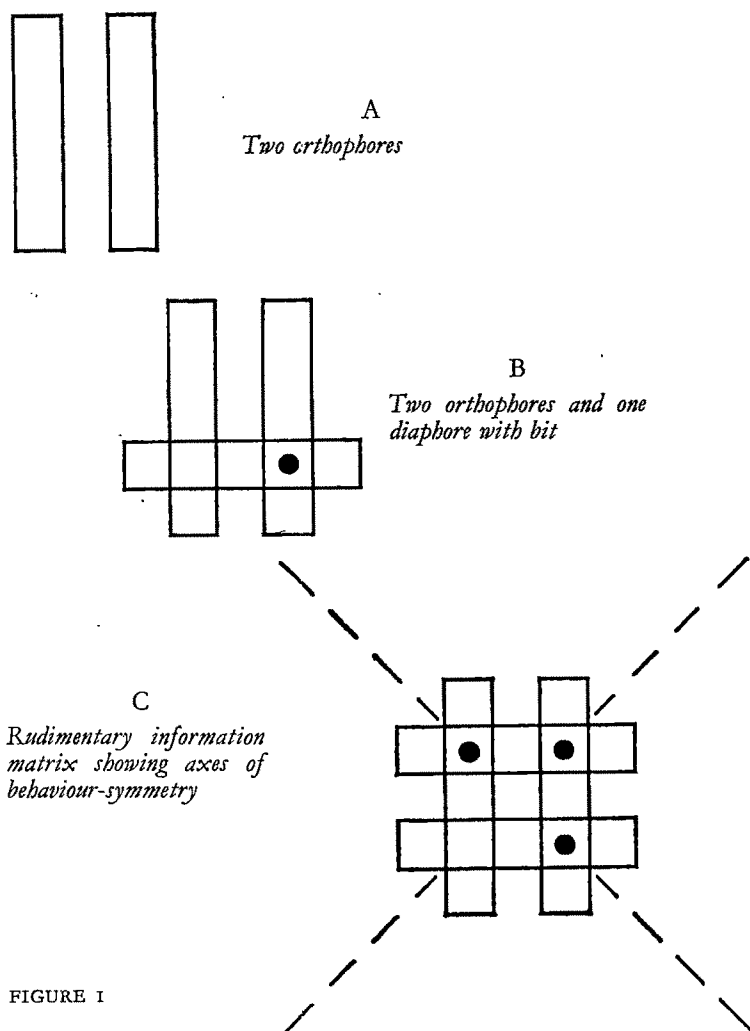


FIGURE 1

To continue building the matrix would be boring; and in any case we now have as much as we need. It is apparent that the diaphores—whichever they are—give the orthophores two characteristics: identity and proportion. The identity of an orthophore is based on *which* diaphores it intersects positively (by convention: it could equally be based on *which* it intersects negatively). The proportion is based on *how many* diaphores it intersects positively. Identity lies in one dimension of the matrix, proportion in the other; identity is at the heart of logic, proportion at that of statistics; identity is the concern of people concerned with retrieval (of librarians, for instance), proportion is that of those concerned with the analysis of populations.

That is why one half of co-ordinate indexing is quite outside the usual activities of those concerned with documentation.

Let us now add a few restrictions: one set of parallel components of our matrix is to represent features, and one is to represent items. The blobs or bits become data units—associations of a given feature with a given item—and the matrix as a whole becomes a data field. The arrays of components become collections of items or lists of features. If we envisage the blobs as holes, we can take a further step in the direction of reality, for we can imagine the item components as item cards, punched to represent the features they possess, and the feature components as feature cards, punched to show which items possess them. We can give numbers to the items and letters to the features, and extend the field a little—say to five items and five features, and see what we can learn.

	O	1	2	3	4
A			●		●
B	●	●		●	
C					●
D			●	●	
E	●	●			

D

A typical data field including the pattern of matrix C. This field is organized for co-ordinate indexing, although it is unusual in that each column contains only two data units. A new item possessing features A and D would simply be added at the right-hand side.

FIGURE 2

In the first place, suppose the items are books, and the cards used are punched item cards. The problem is to find all books possessing features A and C. It must be answered by taking each item card (each item-slice of the data field) in turn, and examining it to find out if it is punched, notched, or otherwise marked, in positions A and C. A question which specifies features and leaves items unspecified, as this does, is a feature question. Clearly, a system of item cards answers it by means which handle every card in the system.

If the same question is asked of a set of punched feature cards, it can be answered by stacking slice A and slice C of the data field, since the items required—the books whose features include A and C—will then appear as holes (coincident positive data units) passing through the stack in the positions occupied by the reference numbers of the documents concerned. A system of feature cards answers a feature question by handling only those cards representing the features the question specifies. It works from the known to the unknown, whilst an item card system must, in similar circumstances, work from all the unknowns in order to find the known.

Our study of the information matrix, however, has shown that data fields are symmetrical in that orthophores behave in the same way whether they are items or features. We can deduce that if a question which specifies items is asked, and leaves the features unspecified, then item cards will answer it by stacking (including by means of a stack of one) whilst feature cards will answer it by lengthier methods based on examining every card in turn.

We can therefore say, in general, that item cards answer item questions best, and feature cards answer feature questions best. Co-ordinate indexing is usually adopted by people with feature questions to answer; so feature cards are increasingly used by them. Even plain feature cards, bearing only lists of reference numbers, have some advantages; but the punched variety have more.

In this the field of documentation leads the way: having been late in adopting synthetic—co-ordinate—methods, it is early in adopting feature cards as a retrieval mechanism.

In passing, we may note that items and features are classes: item 2 is the class of all features which are 2, just as feature B is the class of all items which are B. Stacking two items or two features shows the intersect of the two classes concerned.

Here it may be helpful to compare co-ordinate systems with analytic methods of handling data fields. The two types are interconvertible. In the case of the synthetic, the user need not trouble about the order in which he states the features which interest him: the items can be approached from all features with equal ease and can be stored in any convenient order—often the order of their arrival. On the other hand, as has been shown, a mechanism is needed to facilitate the retrieval of items: this may be a set of feature cards or a set of item cards or—in rare cases—a set of cards each representing a data unit.

No mechanism is needed for analytic methods, but for this advantage they trade their ease of approach. An analytic system is made by choosing the most important type of feature an item may possess, arranging all features of this type in a mutually exclusive, collectively exhaustive array, and numbering or lettering them. Each item indexed is then given the number or letter of the feature it possesses. Next, arrays of second-most-important features are made—often a different array for each of the first-most-important ones—and items are numbered or lettered according to these as well, the second number or letter coming after the first. This process continues as far as is necessary. It is often symbolized by a cascade diagram, the items' reference codes then showing their path through the cascade. Thus item 597 will possess the fifth feature of the most important group, the ninth of the next group of features encountered, and the seventh of the last. This item can be filed with others of its kind in position 597 in any cabinet or on any shelf that is handy.

This is, and will remain, a most helpful method of keeping books in libraries or of describing any system which naturally takes this form—an example is the classification of plants and animals. But the hierarchy of importance in which the features are arranged must correspond to the needs of the user if the method is to be helpful. A personnel officer who arranged the item cards recording his staff in a group of forty ages, and (within each age) in a group of forty salaries and (within each salary) according to occupation, would have sixteen hundred different places in which to look in order to find plumbers.

Thus analytic methods break down the whole collection of items into smaller and smaller groups, adding an extra symbol to the items' code letters or numbers at each stage of the analysis. Synthetic or co-ordinate methods (symbolized by a set of overlapping circles, known to students of logic as a Venn diagram) build up the description of items by the superimposition of features in any order.

In this case the act of bringing the features together does not provide the items with a unique reference code; but the numbers or letters representing the features employed form a collection which, if quoted in a standard order, may do so.

Analytic methods can therefore be converted to synthetics by giving equal importance to every feature used in them, and providing a mechanism for bringing these together. Synthetics can be converted to analytics by arranging for the features listed to be placed in groups—each group containing a set of mutually exclusive, collectively exhaustive, ideas—and then giving these groups a standard order of citation. Mechanisms can then be dispensed with, for retrieval at any rate.

When a data field has been organized by analytic methods, the pattern of blobs upon it becomes neatly arranged; it is usual for every item to have the same number of data units and for the features to show as rows of units (or columns of units) all together. It is very difficult to add features or to subtract them from a field organized in this way without serious disturbance; and the arrival of a new item means that the field must be parted in the appropriate position so that the new item may be entered in its correct place. Co-ordinate techniques, however, allow the field to grow at its edges by simple addition in any convenient way.

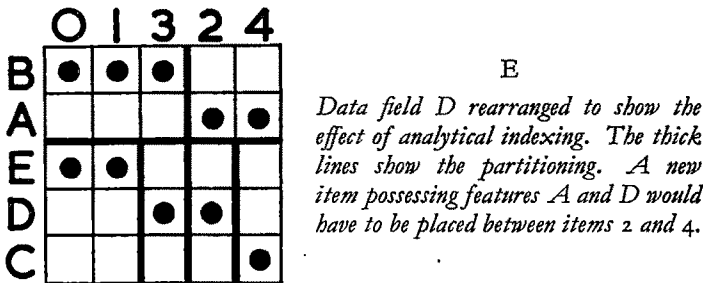


FIGURE 3

We may return to a study of co-ordinate indexes by adding the restrictions required by our data field in order to convert it to a structure suitable for studying subject matter. Items now become entities; features become attributes; the collection of items becomes the universe and the list of features becomes the plenitude. The data field is the holotheme or complete set of notions required for the definition of subject matter. This, together with the appropriate descriptors, is the set of features the co-ordinate indexer must classify or list. He is concerned with one dimension of the data field only; the analytic indexer is concerned with two.

This is the level at which the problems of synonyms, homonyms, crossovers or false drops, convergence, specific versus generic terms, links, roles, dictionaries versus thesauri, and of all similar matters, arise. Fortunately, it is where these notes must end. Only two points need be made.

The first is that the choice of terms for co-ordinate indexing depends on the behaviour of the notions permitted to enter the holotheme concerned. Nearly all existing synthetic systems have been built empirically, and the pattern of their subject is to some extent hidden as a result. The study of the behaviour of ideas is still in its infancy; but enough is known to show that it, too, is symmetrical. Once more this is something we would expect from our study of the information matrix. At every integrative level, attributes and entities are mirrors of each other.

The second is that here, more than anywhere else, the expert in documentation can help the experts in other disciplines. What is discovered about the behaviour of ideas has repercussions everywhere; and the upsurge of interest in co-ordinate indexing methods for information retrieval gives us the impulse to carry on with the chase.

Note on the behaviour of extended fields

Punched feature cards have been described briefly above; their normal fields contain arrays of numbered positions, to each of which an item is assigned. If an item possesses the feature concerned, a hole is punched in the appropriate position in the card. Stacking several cards then shows, as through-holes, all items possessing all features in the stack.

An extended field is a section of a feature card whose hole positions do not represent items, but instead refer to other features. If the feature concerned is associated, in any item, with another feature, that other feature's hole is punched.

If two feature cards with extended fields are stacked, resulting through-holes in the extended field show features which, in some item or other, are associated with both the features in the stack. This gives a lead as to which other cards, added to the stack, may still leave holes through the normal field.

The method, however, is not infallible. This is because (for example) feature A may be associated with feature B in item 1, and with feature C in item 2; if B and C are stacked, the extended field will show that A is associated with B and C. So it is: but with B and C separately, not with B and C together.

Thus the use of an extended field is restricted to guidance as to where to look next: it does not guarantee certainty. It can nevertheless be valuable, not least in showing where it is useless to look at all.

As would be expected, extended fields on punched item cards behave in a similar way.

[An appendix on technical terms is given overleaf.]

APPENDIX

SOME TECHNICAL TERMS IN THE FIELD OF INDEXING

Note. The letters against the definitions show the related definitions at the various levels here mentioned.

At the level of theory:

- a *Matrix*: (information matrix): a set of columns intersected by a set of rows, each dimension of the matrix representing one of two unspecified types of meaning.
- b *Component*: any row or column in a matrix.
- c or d *Orthophore*: the row or column with which the speaker is concerned.
- c or d *Diaphore*: a component of a matrix intersecting an orthophore.
- e *Bit*: (binary unit of information): a mark placed at the intersection of an orthophore and a diaphore, indicating which choice is made between two states, often known as positive and negative states.
- f *Complex*: a set of bits so chosen that (a) all are positive, or all are negative and (b) they occupy every intersection of two or more orthophores with two or more diaphores.

At the level of indexing:

- a *Data field*: a matrix in which one dimension represents items and the other represents features.
- b *Meaning*: an item or a feature in a data field.
- c *Item*: a thing indexed (*item question*: a question specifying an item or items; *item card*: a plain or punched card representing an item).
- d *Feature*: a characteristic of a thing indexed (*feature question*: a question specifying a feature or features; *feature card*: a plain or punched card representing a feature).
- e *Data unit*: an association between an item and a feature: *positive* if the item possesses the feature, *negative* if it does not. A positive data unit is shown as a mark (usually a black disc) at the intersection of meanings in a data field (*unit question*: a question specifying a data unit or units; *unit card*: a plain or punched card representing a data unit).
- f *Compound*: a pattern of data units showing all the features possessed in common by a given set of items—identical with all the items possessed in common by the appropriate set of features (*compound question*: a question specifying a compound or compounds; *compound card*: a plain or punched card representing a compound).
- g *Document*: an item possessing subject-matter.
- h *Autologue*: an item without subject-matter.
- i *Term*: a feature of subject-matter (detectable because it can always be preceded by the phrase: 'the item is about . . .').

- j *Descriptor*: a feature not referring to subject-matter.
- k *Collection*: all the items indexed.
- l *List*: all the features used in the index.
- m *Compresence*: a linked set of features describing one given item, or of items defining one given feature.

At the level of subject-matter:

- a *Holotheme*: all the notions considered as subject-matter: can be represented as a matrix or data field of entities and attributes.
- b *Notion*: an entity or an attribute.
- c *Entity*: a thing mentioned as subject-matter.
- d *Attribute*: a characteristic mentioned as subject-matter.
- k *Universe*: all the entities discussed (the 'universe of discourse').
- l *Plenitude*: all the attributes discussed.
- m *Topic*: a linked set of terms describing one given subject. Terms can form cross-links (*crossovers*) which produce false drops or irrelevant references when an index is in operation; in general one substantive topic yields no such crossovers. (An alternative word is *theme*: see Cleverdon, C. W. and Mills, J. The testing of index language devices. *Aslib Proceedings*, vol. 15, no. 4, April 1963, p. 125.)

(Subcoding, not here mentioned, is best treated at the level of theory.)

Morning session (continued)

THE Chairman introduced the second speaker, Mr B. C. Vickery. He said that the first occasion on which he had heard Mr Vickery speak on indexing was fifteen years earlier. At that time, Mr Vickery was with Imperial Chemical Industries; but had already developed his interest in indexing techniques whilst a chemist, and later as Information Officer, at Ministry of Supply Ordnance Factory. Since 1960 he had been Deputy Director of the National Lending Library for Science and Technology. His extended study of indexing techniques had led to the writing of a number of books and the giving of many papers, and he was a founder member of the Classification Research Group in 1952.

VOCABULARIES FOR CO-ORDINATE SYSTEMS

B. C. VICKERY, M.A.

National Lending Library for Science and Technology

Co-ordinate Indexing Conference, London, 14th March 1963

INDEXING documents can be a purely mechanical operation or a highly intelligent one. It can be nothing more than a matter of listing the words in the title of the document, or it can be a detailed intellectual analysis of its content. But however the work is done, it ends up in the same way: the document gets labelled with a set of words (D). When it comes to searching the index, we again have to make up a set of words (Q). Retrieval is the operation of matching question words against document words. In co-ordinate indexing, a document is retrieved if its word labels D include the question words Q. If we alter the words used for documents or questions, we affect the efficiency of the system.

How do words affect efficiency? Consider first what happens in the search

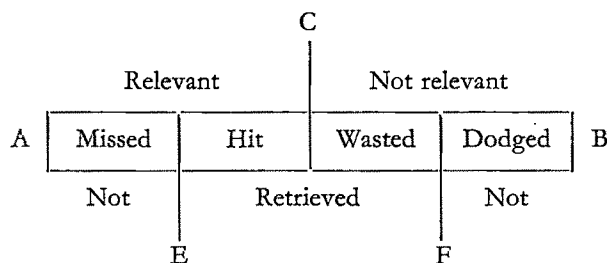


FIGURE 1

of an index. In Figure 1, the rectangle AB represents the whole document collection. With respect to a particular query, section AC is relevant, CB is not relevant. But when we formulate the query in question words, we do not usually retrieve section AC of the collection. We retrieve section EF—some of the retrieved documents (EC) are relevant, some (CF) are not relevant, and some

relevant documents (AE) are missed. Any search, any matching of document words and question words, divides up the collection into four parts—hit, missed, wasted and dodged.

Clearly, in the ideal retrieval system we would all like, EF would be shifted along to the left till it coincided with AC. We would have no misses and no waste. The ideal is unattainable, but we can vary a number of factors to make our system more efficient. In the simplest form of co-ordinate indexing, we read through a document and choose from it as many words as we think we need to label it. I shall consider three ways we can vary this procedure.

1. *Use more words per document*

The use of too few indexing words results in misses. For example, in the Cranfield test, one document was Uniterm indexed by the words Fuel, Systems, Supersonic and Engines. It was sought in answer to a query, 'Cooling the engine in high speed flight', by co-ordinating the question words Cooling, Engines and Supersonic, and was not found. The Q word Cooling was not among the D words—although the document was relevant to the query.

Misses of this kind are clearly an argument for greater depth of indexing (the use of more words to index each document). The ease with which we can increase the number of D words is one of the great strengths of co-ordinate indexing. There is in theory no limit to the number of words we can use, and many co-ordinate systems use ten, twenty or more words per document. An example is shown in Figure 2. The article in *Chemical Engineering Progress* (CEP) might in conventional shallow indexing be indexed only by three words. In the co-ordinate system used by the American Institute of Chemical Engineers (A.I.Ch.E.), seventeen index words are used.

There is no doubt that the use of more words per document improves the efficiency of recall—there are fewer misses. One Cranfield test produced the following figures:

Words per document	3	5	8	12½
Recall factor (per cent)	65	73	81	83

(The recall factor is the ratio EC/AC).

As the number of words per document rose from 3 to 8, in this experiment recall rose from 65 to 81 per cent, but there is a limit to this process—there was no great improvement in recall as the number of D words rose from 8 to 12½. The absolute values in this experiment cannot be taken to have general validity, but the trend is clear: using more D words—up to a point—improves recall, but there is a point beyond which recall is no longer improved.

Increasing the number of D words has another effect. Inevitably, some of the added words will refer to minor topics in the document. We will then retrieve the document in a search for these topics, even though it contains very little information on them. It may be irrelevant to queries on those topics. For example, the CEP article would be retrieved during a search for 'denitration of uranyl nitrate', even though it contains only a sentence or two on this topic and might be useless to the inquirer. So adding more D words, while it increases the number of hits, may also increase the amount of waste.

Article in *Chemical Engineering Progress*, vol. 56, no. 1, 960, p. 102

Title: Atomized suspension speeds reactions. New hot-wall tower technique seen applicable to many chemical processing operations.

Levels of indexing

Shallow

Atomizing
Suspension
Reaction

Deep

Atomizing
Denitration
Drying
Gas
Latent heat
Liquid
Pyrites
Radiation
Reaction
Roasting
Spraying
Sulphite liquor
Sulphur dioxide
Suspension
Uranium oxide
Uranyl nitrate
Wall

Links and roles

1. Reaction—H
Atomizing—J
Suspension—J
2. Liquid—A
Spraying—J
Drying—H
Atomizing—J
Gas—J
Latent heat—J
Radiation—J
Wall—I
3. Sulphate liquor—A
Sulphur dioxide—B
Spraying—J
Drying—H
4. Pyrites—A
Roasting—J
Drying—H
Spraying—J
5. Uranyl nitrate—A
Uranium oxide—B
Denitration—J

Meaning of roles

A—Input, reactant
B—Output, product
H—Active concept
I—Passive concept
J—Means of accomplishment

FIGURE 2

The use of more D words has yet another effect—it increases the possibility of false co-ordinations. For example, the CEP article, deep-indexed, would be retrieved in a search for the effect of radiation on sulphur dioxide. Such false co-ordinations can be reduced by linking together the words that express a particular topic in the article. The link code 3 is assigned to the words that express the topic 'production of sulphur dioxide from sulphate liquor by spraying to dry it'. This is equivalent to indexing separately each topic in the article—the normal practice in conventional indexing.

To sum up on this point, co-ordinate indexing systems allow us to use many words per document, but this facility must not be abused. Beyond a certain point—which each indexer must decide for himself—the use of more D words no longer improves recall, and starts to retrieve too many irrelevant documents.

2. *Control the words used*

Lack of control can lead to misses. The document may be indexed by one

word, and sought by its synonym or some allied word: a match is not made, and the document is missed.

To guard against misses of this kind, instead of choosing indexing words freely from documents, we can restrict them to a structured vocabulary. Any such vocabulary consists essentially of a list of words likely to be found in documents, with two added features:

- a*, some words are not allowed as indexing words, they are treated as synonyms;
- b*, the generic, specific and other relations of each word to other words are shown.

By *see* references, we reduce the misses due to synonyms. By showing relations between words, we help either the indexer or the searcher or both to move from one word to another that may be relevant to the document or the query.

Every time a different form of structured vocabulary is produced, it is announced as a revolutionary discovery. In fact, there are only two basic forms, and each has been evolving in the same way.

The first form is the alphabetical list of words with *see* and *see also* references. The conventional type is the subject-heading list. Each entry in the list is a complete heading—sometimes a phrase, or a succession of nouns. In the modern version of this form, the phrases and the noun compounds have largely been broken up and the individual words separately listed: this is the thesaurus. In Figure 3, you will see cross-references found in the A.I.Ch.E. Thesaurus.¹ A searcher may be led towards the words 'atomizing', 'drying' and 'radiation' if he consults the words 'dispersing', 'mists', 'evaporation' and so on in the Thesaurus. The cross-references help the searcher to enlarge the number of Q words he can use to locate documents, and so to increase the number of hits.

The second form is the classified list of words, with an alphabetical key containing *see* references. The conventional type is the enumerative classification, where each class is a subject-heading. In the modern version of this form, the compound classes have largely been broken up and the individual components separately listed: this is faceted classification. Again in Figure 3 you will see relations between words shown in a faceted classification. A searcher may be led towards the D words 'atomization', 'drying', 'reactions', etc., if he consults the schedules at the entries 'drop formation', 'evaporation', 'activation' and so on.

Despite the differences in form, the relations shown between words in the different forms of vocabulary do not widely differ. Each serves the same purpose, and the indexer must decide for himself what form will suit him best. Undoubtedly, the use of a vocabulary showing relations between words does help recall, though it may also increase the amount of waste retrieved.

Eugene Wall has recently published the results of a test illustrating this.² He searched a Uniterm index:

- a*, with three question words expressing the subject of interest, and
- b*, with a further sixteen words suggested by consultation of the A.I.Ch.E. Thesaurus,

Cross-references in Thesaurus

Atomizing *from* Dispersing, Mists, Separation, Suspending
 Drying *from* Evaporation, Heating
 Radiation *from* Dispersers

Links shown in faceted classification

Qr Fluid mechanical properties
 Qrp Bubbles
 Qrq Drop formation, *atomization*

Ub Unit operations
 Ubg Gas cleaning
 Ubh Absorption
 Ubk Extraction
 Ubm *Drying, roasting*
 Ubr Evaporation

Qv Heat transfer
 Qvd Conduction
 Qvg *Radiation*
 Qvk Boiling, phase change

Qt Change of state
 Qtl Evaporation
 Qts *Latent heat*
 Qtt Phase equilibrium

Ok Reactions
 Okb Rate
 Oke Activation
 Okp Catalysis

FIGURE 3

and compared the outcome with the (known) total number of relevant documents in the index. The results showed that the plain search retrieved only 8 per cent of the relevant documents. Assistance by the thesaurus increased this to 68 per cent, but reduced the precision—all documents retrieved by the plain search were relevant, but only 49 per cent of those found in the thesaurus search were relevant and 51 per cent were waste.

To sum up, the construction of a structured vocabulary—thesaurus or faceted classification—is valuable if a high percentage recall is important. This again is a matter that each indexer must decide for himself.

3. *Make words more specific or more generic*

If the permitted indexing words are too general, then we may index and search for a document by a generic term U, when the real target of the query is a more specific topic V. We may retrieve the document but find it to be irrelevant waste. On the other hand, if our indexing words are much more specific than our queries, there may be many misses, because we do not follow up all the specific D words that may be relevant to a generic query. It is important to match the specificity of indexing words to the kinds of query that the system has to meet.

Some designers of co-ordinate systems stress the danger of misses due to the use of too specific indexing words. Calvin Mooers, for example, is always urging the case for a relatively small vocabulary of generic descriptors. Recently, the opposite danger—of waste due to too generic descriptors—has been more stressed, and a new means of sharpening the specificity of indexing words has been introduced—the use of ‘roles’.

This practice is illustrated in Figure 2 showing the indexing of the CEP article. For example, drying by atomizing to a gas is coded Drying-H, Atomizing-J, Gas-J, and this document would not be retrieved by a search on the drying of gases, which would be coded Drying-H, Gas-A. The word ‘gas’ is made more specific by modifying it to show its role—reactant, product, means of accomplishment, and so on. I may mention, in parenthesis, that the assignment of role indicators to words in a thesaurus is exactly comparable to assigning the same word to several facets in a classification.³

SUMMARY

Let me try to sum up the ways in which words can be used in co-ordinate indexing.

1. The main differences between co-ordinate and conventional indexing are that in the former:

- a*, more index words per document are used,
- b*, each word is in the first place assigned to the document independently, and
- c*, the words are in the first place drawn freely from the documents indexed.

These features give co-ordinate indexing great flexibility, and increase the number of hits in retrieval.

2. But these advantages bring disadvantages in their train. Along with a greater number of hits comes a greater amount of waste, and there is an economic limit to the number of document words used. The waste may be reduced by a return to a more conventional indexing technique—the linking of document words so that each topic in a document is separately indexed.

3. The indiscriminate use for indexing of words found in documents has disadvantages long known to conventional indexing, and co-ordinate indexing too must find ways of eliminating synonyms and linking related words. The only means of doing this are the conventional ones of cross-reference or classification. The modern forms of these techniques, usable either for conventional or co-ordinate indexing, are the thesaurus and the faceted classification. The assignment of the same word to various categories—expressed by role indicators or facet indicators—still further refines the vocabulary used.

It is clear that the techniques used by co-ordinate indexing are not so revolutionary as they are sometimes made out to be. It is simply that their form looks unusual, a form imposed by the form of the file itself—the ‘feature-card’ approach.

There is no one ‘best’ way of constructing a co-ordinate indexing system. The larger the document collection, the more deeply it is indexed and the more

varied its subject matter, the more will the indexer have need to introduce links, roles, a thesaurus or a classification. As with all retrieval systems, we can only design one efficiently if we know its scope, its ultimate size, and how it is to be used. These are the things we must decide before we can choose its vocabulary.

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2. WALL, EUGENE. Information retrieval thesaurus. New York, Engineers Joint Council, 1962.
3. VICKERY, B. C. Faceted classification. London, Aslib, 1960. As an example, see English Electric Co. Ltd. Faceted subject classification for engineering. 3rd ed. Whetstone (Leicester), 1961.

DISCUSSION ON MORNING SESSION

Mr R. A. Fairthorne (Royal Aircraft Establishment, Farnborough) said that so-called 'co-ordinate indexing' stood or fell on its ability to describe any item in the collection as belonging to a set of overlapping classes of items. Therefore one must use classes that overlapped as much as possible: not classes—such as those defined by 'subject headings'—that overlapped as little as possible, or classes defined by proper names, that did not overlap at all and applied to very few items anyway. Subject headings, proper names, dates, and so forth were extremely powerful tools to be used in conjunction with joint-attribute systems, but were lethal if used as attributes within such a system. Indeed, one must be careful not to associate dictionary words of any kind as labels for 'attributes', 'features', or 'descriptors'. Natural language did not describe things in this way, and rarely possessed words for the vague overlapping notions (*not* 'concepts') that one was compelled to employ. Still less had it labels for the classes of items used in the internal working, as opposed to the external invocation, of the system. Some people argued that, because the internal markings did not affect anything but the workings of the system, the ultimate classes corresponding to the marks should have no direct semantic interpretation. In the earliest, and still the most efficient, system of this kind—Mooers' 'Zato-coding'—the semantics were deliberately 'scrambled' to provide efficient internal classes. (The same principle could be applied to item-on-feature as well as to feature-on-item files.) Whether one did this or not, one could not by-pass the necessity for some intermediary—thesaurus, code dictionary, artificial syntax, computer, or what-have-you—to convert the natural language of invocation to the essentially artificial working language of description by overlapping classes.

Mr J. Platou (The Sulphur Institute) wanted to know the use and value of 'posting on' indexing terms to broader classifications (for example sulphur dioxide: 'post on' to oxides/inorganic).

Mr Vickery replied that if practical experience showed that when people searched for a broad term, such as 'inorganic oxides', and would find it useful to retrieve documents on narrower subjects, such as 'sulphur dioxide', then it would be useful to post the narrower on to the broader.

Mr R. Moss (Shell Chemical Company Ltd) said that had he not had some practical experience in the construction of a vocabulary for chemistry he might have come to the conclusion that the co-ordinate method had no advantage over orthodox classification. However, his experience and that of the pioneers whose work he had seen, namely Mr Snel, Mr Boyd and Mr Johnson, had convinced him that it had. He acknowledged also other pioneers whose work he had not seen. The co-ordinate (or Keyword) method was extremely simple. It was so simple that probably no one who had followed the history of classification over the past decade could easily believe that it would work. But there were two reasons why it did. He did not wish, and no one needed, to enter into the philosophy of the argument but those who were

interested would be able to find it in the work of Bertrand Russell on 'Minimum Vocabularies'.^{*} These were the Keywords. No one should be deterred by the apparent lack of meaning or precise definition attached to Keywords. Keywords for co-ordinate indexing were used not as meaning but as symbols. The subtle distinction between meaning and symbol in the use of words had been covered forty years ago by Ogden and Richards.[†] Again, no one needed to bother about the theory, but the significance of their work was that it led on to Basic English. We were now, in effect, seeking a basic vocabulary for chemistry. For indexing purposes, words as symbols meant finding 'parking spaces' for words. Mr Fairthorne had used this expression and had dealt with it very well in his recent book. The main fault of 'Peek-a-Boo', at present, was that the parking meter ran out at about 15 to 20,000 positions, depending on the size of the card.

Mr Jack Mills (Aslib Cranfield Research Project) pointed out that whilst the advantages of a deliberately restricted vocabulary might be considerable (if it were skilfully controlled) it was dangerous to let the matter rest at that. The Cranfield Project had shown clearly enough that the amount of relevant material that was found during a search depended a great deal on the exhaustivity of the indexing, i.e. the degree to which the various concepts dealt with in each document were recognized by inclusion in the index. If a request were made for a subject and the name of that subject did not appear *somewhere* in the index, there was a strong chance that the subject would not be located.

One might distinguish an 'active' vocabulary (the terms actually used as headings in the index proper) from a 'reserve' vocabulary in which *all* the keywords used by the searchers could confidently be found and which would act as a 'lead-in' to the active vocabulary. An example of this would be a really full alphabetical index to a classified file, which might use a vocabulary far wider than that appearing in the schedules from which the classification was drawn.

Mr R. Snel (Shell International Petroleum Company Ltd) said that vocabularies could be short if selectively made up; that it was necessary to watch the fact that information items *did* use too many words which were non-essential; that a thesaurus was *not* needed if the word list were optimum; that the careful *editing* of a summary could solve a great deal of the indexing problem.

The Chairman said that with regard to vocabulary structure there were many possible arguments on both sides. It seemed to him, however, that the crux of the matter was the inability of co-ordinate systems to cope satisfactorily with successive levels of generality. He would like to see the classification makers and the co-ordinate indexing specialists get together, and make an integrated system combining the advantages of both classification and feature cards. Such a system could, for example, use the Universal Decimal Classification down to a certain level, and feature cards for a group of specific terms only.

Mr A. E. Cornfield (BP Research Centre, Petroleum Division) thought that both lecturers had overlooked the fact that the systems operated by Mr Snel and Mr Boyd were dependent on the provision of a descriptive summary for each item, prepared by a technologist after careful analysis, identification, and selection of the articles for accession. Naturally the articles covered the fields of major interest to the organization concerned. These descriptive summaries were entered on the unique accession cards which were filed in numerical sequence and were therefore readily available and easy to consult. This being so, a high recall ratio was more likely to be beneficial to the inquirer than otherwise. However, greater specificity could be achieved by requesting additional interests from the inquirer and superimposing the corresponding feature cards on the pack under examination; and experience had shown that rarely was it necessary to use more than five feature cards in order to obtain satisfactory retrieval. He reiterated that the descriptive summary was the final arbiter for selection and was readily available and easy to digest.

^{*} Russell, Bertrand. Human knowledge: its scope and limits.

[†] Ogden, C. K., and Richards, I. A. The meaning of meaning.

Afternoon session

MR JOHN R. SHARP, Deputy Librarian and Information Officer, British Nylon Spinners Limited, introduced the afternoon session with a short talk, and slides. He said that the purpose of the conference was to discuss the two fundamental issues in co-ordinate indexing: *a*, the theory underlying concept co-ordination, and *b*, practical applications of such indexing, using optical stencil cards. For this reason the question of the various ways in which the principles could be applied had been felt to be subordinate but worthy of a brief mention.

The first thing was to understand clearly what we meant by co-ordinate indexing and the reason why this expression was used. We did not mean 'co-ordination' in the sense in which it is used in mathematics, but its connotation was that found in the context of the calculus of classes. This could usefully be illustrated by the use of Boolean algebra, with the aid of Venn diagrams. Three basic principles were relevant to our purpose and these were the concepts of the logical sum, the logical difference, and the logical product, which had their respective practical manifestations in the following questions:

1. the demand for information on *either* subject concept A or B
2. the demand for information on A but *not* B, and
3. the demand for information on A *and* B.

The logical product was undoubtedly the most important of the three relationships, for the simple systems to be dealt with in the afternoon session were used almost invariably to answer this type of question.

In applying co-ordinate principles we could base the systems used on two types of record, either item entry or term entry. Item entry systems involved the creation of a discrete record for each document, with that document's identity and the several subject terms assigned to it in indexing. Term entry involved the provision of a discrete record for each subject concept or 'feature', with the identities of the several documents to which each feature was relevant appended. Item entry systems had the disadvantage that the whole of the store needed to be passed through the searching device each time a search was made. Term entry systems avoided this difficulty but precluded the possibility of providing anything but the briefest document identity as output.

Typical item entry systems were: edge-notched cards, machine-sorted punched cards, Eastman Kodak Minicards, Ralph Shaw's Rapid Selector, and commercial versions of film searching devices such as Avco Corporation's 'Filesearch'.

Term entry systems had not lent themselves to mechanization to the same extent as had item entry systems. One of the best known applications was the Uniterm system. Another was the comparison of magnetic tapes bearing lists of numbers against features, for the purpose of detecting common numbers. Machine-sorted punched cards had been applied to some extent by the use of one card per term per document, so that a block of cards existed for each feature used in the system, and searching was carried out by running pairs of blocks

together through a collator for the purpose of selecting cards with common numbers. Finally, the optical stencil card method had been shown to be an effective and cheap way of applying co-ordinate indexing and for this reason was being used more and more. It was the practical applications of such systems with which the conference was concerned, and all four speakers at the afternoon session would give accounts of their experience with this type of equipment.

The Chairman then introduced the speakers in the order in which they were to speak: Mr Boyd, Mr Childs, Mr Johnson, and Mr Shedden.

PRACTICAL APPLICATION OF 'FEATURE CARD' SYSTEMS. I

G. M. BOYD, O.B.E., M.R.I.N.A., A.M.I.STRUCT.E.

Technical Records Officer, Lloyd's Register of Shipping

Co-ordinate Indexing Conference, London, 14th March 1963

AFTER the wealth of theory and principles that we have had this morning, I feel something like awe to think that I have been operating co-ordinate indexing systems for about eighteen years without knowing anything about the basic theories.

This may be some consolation to those in the audience who are dissatisfied with their present systems, and are contemplating changing over to co-ordinate systems. I can assure them that it is not so difficult as it seems, and common sense is an adequate guide for most purposes.

As Mr Fairthorne has indicated, the basic guiding principle should be to provide features in the form of broad overlapping ideas, which by superimposition serve to narrow down the field of search, rather than to provide precise definitions or descriptions of individual items. It is better, however, to use separate features for separate ideas, rather than to define an idea by several features. For instance, it is better to have a single feature for 'big end' (of an engine) than to use the two features 'high' and 'last' as we have been doing. If such dual (or treble) features are used arbitrarily, they should be carefully chosen so that they are unlikely to occur separately in the same context as the feature so designated.

At Lloyd's Register we originally introduced co-ordinate indexing in the form of edge-punched cards for surveyors' reports about eighteen years ago, and we now have over 100,000 such cards, operating very satisfactorily.

When we came to reorganize our technical library about five years ago, we chose the 'inverted' system, i.e. body-punched feature cards, for reasons given in my recent article in *Engineering*.^{*} This has been very successful, and we now have well over 25,000 entries, which can be completely searched positively and confidently in about half an hour. Most searches, of course, take much less time than this.

^{*} *Engineering*, vol. 194, no. 5036, 26th October 1962, p. 545-8.

Our technical library consists of relatively few books, but we take about 220 periodicals covering a very wide field and in addition we have the transactions of a large number of technical institutions.

All this matter is selectively indexed by the system, which uses about 430 features, covering author, source, form and subject.

Our feature cards provide for 10,000 positions on 2 mm. rectangular centres, the holes being about 1 mm. diameter. The positions are arranged in 100 groups of 100 positions each, on plastic cards 8.05 in. $\times$ 8.55 in. Edge-punching is provided on the top edges for alphabetical and group sorting of the feature cards.

The holes are punched with a simple electrically operated machine. The machine we use, which is illustrated in the article referred to above, was home-made, but a commercially produced version is now available.

The item cards, which are standard 5 in. $\times$ 3 in. size, are filed in numerical order. Two items are entered on each card, one on each side. Each item entry indicates the title, source, date, 'shelf number', and a short abstract, as well as a list of the features used.

We operate the system in collaboration with our neighbours, the Institute of Marine Engineers, who have a duplicate system, and the task of abstracting is shared between us.

The system operates quite satisfactorily, and we have no complaints. Nevertheless, we are in the process of reviewing our feature list in the light of experience. This will probably mean only a slight 'polishing up' with no radical changes. This is perhaps surprising, since the original feature list was drawn up the hard way, at a time when there was practically no available information on the construction of such lists.

The moral is that the system is so flexible that even a relatively crude selection of terms suffices. It is natural, however, that a better understanding of the basic principles should lead to a more polished result.

We have found no need for 'structure' in the form of links, role indicators and the like, and we feel that the complications to which these give rise are not justified, except perhaps for more sophisticated purposes.

Our average number of features per item is about fifteen or twenty, but we find that most inquiries can be satisfied by using only two or three features.

PRACTICAL APPLICATION OF 'FEATURE CARD' SYSTEMS. II

S. B. CHILDS

Librarian, Bristol Aircraft Limited, Guided Weapons/TIB

Co-ordinate Indexing Conference, London, 14th March 1963

I. INTRODUCTION

THE Bristol Aircraft Limited Guided Weapons Department is a comparatively new organization with its own technical information and library services; its modern Technical Information Bureau (TIB) is a self-contained unit serving the whole of the organization with general services for the lower levels and special services for the higher.

The general service to technical staff at first included a subject approach to the TIB document collection through the medium of an alphabetically arranged subject card index; but it soon became evident that this system would not provide for the depth of indexing necessary to enhance retrieval of the ever-growing volume of information in our own special fields of interest, without expanding the classification scheme and having a small army of clerks to prepare the cards for the consequent points of entry into the system.

To meet this technical need of information control we began about four years ago to look for a suitable system; several offered themselves for consideration but our choice was going to be influenced by several factors, mainly:

- a. Low cost*, necessitating a manually operated system, since large capital outlay for machine operation was far in excess of the funds available.
- b. Simplicity of operation*, since policy ordained that we provide a technical service from a basically clerical organization.
- c. Flexibility*, to meet the demands of ever-changing requirements in technical description.

In considering our choice of system we worked in conjunction with the technical staff and finally agreed upon the Brisch Vistem System of punched cards as the means of recording information, with a home-made index of technical terms as the key to the place in the system where information was stored and to be retrieved.

2. ESTABLISHING THE SYSTEM

To provide the flexibility and simplicity desired, again working closely with the technical staff, we drew up a schedule of technical terms, arranged in alphabetical order (no degree of classification), which we considered would cover our fields of interest sufficiently for a start to be made in the operation of the system. A natural building up of the index could then be developed and issues of the index made whilst the work of compiling it was in progress.

We obtained the Brisch Vistem feature cards and a special punch for body-punching the cards. The initial cost for these was £50. To facilitate the storage

of the feature cards and the recording of indexing details each technical term in the index was allotted a code number, this number being repeated on each appropriate feature card.

At the outset the system was staffed by one clerk working in liaison with indexers nominated from the technical staff for the indexing of reports. The system was to cover the following sources of information:

- a. Technical reports and notes.
- b. Reports received on short loan from other libraries.
- c. Articles selected from the periodicals and journals taken by the TIB.

3. SYSTEM OPERATION

a. Information storage

The information storage and retrieval function begins with the accessioning of documents in the TIB technical documents register for retention reports, and in the TIB loan register for loan documents and articles from periodicals. The latter also controls the allocations of accession number which is typed on to the abstract card for each document and punched out on the appropriate feature cards. We call this accession number the 'P.C. number' because it is different from the accession number given to retention reports and connects the feature card punched number with the abstract card number during retrieval operations.

For each item entered in the registers we raise an abstract card (Figure 1). Sometimes this is typed but quite often the cut-out card provided with the report is used; the back of the abstract card we imprint with a stamp designed to show an adequate number of boxes to hold all the coded indexing details.

The report and abstract card are passed to the indexer; from the index, terms are selected which define accurately the information to be stored, and the code for each term is entered in the boxes provided. When the system operator receives back the indexed report he selects from storage the feature cards bearing the code numbers displayed on the abstract card, assembles all such cards in register, locates on the body of the uppermost card the number corresponding to the P.C. number, places all cards under the punch and punches out the P.C. number. The information is now recorded.

From the example I have shown, you will see that by one simple punching operation information has been recorded simultaneously under eight different features (terms) in the index. The recording of course can be done from the abstract card, thus releasing the report for circulation or for storage.

The indexing of reports by the nominated indexers drawn from the technical staff in the organization quickly proved to be unsatisfactory. There were a number of reasons for this. Too often it happened that reports were ready but, through causes unforeseen, the indexer was not available; when he did become available, the reports had already been released for use by other technical staff demanding circulation. The indexer was inclined to consider only his own particular interests when indexing a report and leave untreated information that fell outside his subject field. Information control demands that *all* the information in a report shall be indexed, so it soon became clear that all the indexing should be done within the Technical Information Bureau and that it could, with

some training, be done by the TIB staff. The ease of application of the system has enabled us quickly to reach the stage where reports are indexed by TIB staff, although we still consult technical staff about particularly difficult reports. Specialized knowledge of particular subjects is not necessary and the general knowledge of fields covered, which the TIB staff have acquired through

OBVERSE

RECOVERABLE AIR BREATHING BOOSTER FOR P.C. 9153
SPACE VEHICLES. LANE R.J. MAR. 1962 L.R. 7965
BRISTOL SIDDELEY ENGINES LTD. FULTON. TRH 68

Part 1; The characteristics of rocket and air-breathing engines are compared, and the ultimate performance advantages conferred by air-breathing engines are shown.

Part 2: A brief description of the air-breathing engines which are available to us at low, medium and high speeds.

Part 3: In this part realistic combinations of these engines in the satellite boosting role are compared with the ultimate system.

Finally, some tentative conclusions on the future of air-breathing and rocket propulsion for satellite boosting with recovery are made.

33 pp / 31 fig / 1 ref / UNCLSD.1

REVERSE

DOCUMENT PROCESSING CODE NUMBERS					
Motors	Satellite	Space	System	Performance	Propulsion
305	424	462	495	688	692
Rockets	Comparative	Propellant	Recovery	Air-breathing	
694	856	910	997	1061	
INDEXER'S INITIALS: <i>W/D</i>			DATE: <i>21/6/62</i>		

FIGURE 1. A sample abstract card

practice, enables them to select from the index those technical terms covering the information to be stored. We achieve indexing in depth and do not have to worry about deciding under which twig of a classification tree we have to put the information.

The storage of abstract cards is by numerical order of P.C. number, and the feature cards are stored by numerical order of code number. We found that the extracting and replacing of feature cards during information recording operations was a rather long-winded process. We tried to speed this up and found that a two-man team, working together, one consulting the index code numbers on the abstract card and assembling appropriate sets of feature cards, and the other carrying out the punching operation, could deal with sixty reports in four hours. (This does not represent the rate at which we were receiving documents, but proved a maximum rate at which we could deal with them.)

b. Information retrieval

Retrieving information is the reverse procedure of storage; the trouble is getting into reverse. In nearly all cases whenever an information request is made which involves a subject approach there is a preliminary interrogation period of about five minutes during which all possible leads to searching are obtained from the inquirer. The specific area containing the information must be adequately defined and technical terms corresponding to the definition determined. Quite often the inquirer has used technical terms which are neither familiar to the TIB staff nor appear in the index but which, when interpreted, do have the same meaning as terms already in use. I think this is a snag in the system but one which we are overcoming by including the inquirer's version of the technical terms in the index under the code number common to both his and our own established terms; the index will gradually acquire the characteristic of a thesaurus.

Once we have established exactly what the inquirer wants, searching can begin. All the feature cards bearing the technical terms concerned are extracted and examined. Readers will already be familiar with the mechanics of the examination. What we have found is that, although we have been as specific as possible when determining which feature cards shall be examined, we have never had a 'clear sight' with all the cards so extracted held in register. We have always scored our direct hits through the examination of combinations of feature cards concerned (pairs, threes, sometimes even fours). It is our policy always, after a successful search, to check the index coding details on the abstract card and compare them with the technical term code numbers under which we initiated the search; in nearly all cases we have found that the document, or documents, retrieved had been indexed under almost twice as many terms as were used for their retrieval. I think this points out the advantages of indexing in depth, which is so easily achieved in this system; but, of course, it could also result in a high ratio of recall to precision, and this we are prepared to accept in order to retrieve the information instead of missing it.

4. SYSTEM MAINTENANCE

The librarian should maintain strict control over the index of technical terms;

no new term should be introduced without its control through the application of certain rules. The rules we use are as follows:

1. If the term under review is a synonym, include it in the index, but code it in common with the feature card already in use; otherwise include it in the index and raise a new feature card for it.
2. The term must be either generic or specific and never a combination. (The application of the co-ordinate concept effects a great saving in feature cards used; generic terms such as Reliability, Performance, Design, Characteristics, etc., are very frequently co-ordinated with specific terms.)

In the light of further experience with the system, additional rules may have to be formulated; there tend to be quite borderline cases where closely related terms are claimed to be synonyms.

We always work closely with technical staff over the introduction of new terms or the modification of terms already in use in the index. Modifications are not desirable and so far we have had no reason to alter—except for the inclusion of new terms—any parts of the index. Contraction of feature cards is a fairly simple matter but expansion is a quite difficult operation. This might become necessary if some related but infrequently used terms, which had been grouped under one feature card during compilation of the index, should later begin to be in very frequent use. It would then be essential, in the interests of retrieval and cutting down of searching time, to transfer these terms each to a separate feature card.

5. STATISTICS

Number of terms now in use in the index	1,078
Average number of items indexed per day	15
Average indexing time for each item	15 minutes
Average number of feature cards punched for each item	10

6. CONCLUSIONS

So far the system has proved satisfactory to our needs and, remembering the factors which influenced our choice, I do not think we could have done much better. We think it is too early yet to assess accurately its efficiency of retrieval.

Its advantages are: its low cost; the comparative simplicity of operation; its flexibility—expansion of the index is an easy matter; and the fact that it facilitates the production of bibliographies.

Its disadvantage is that it does not permit of browsing.

I should like to refer back for a moment to the cost of the tools of the system (section 2 above). It is decidedly wisest to buy the properly designed storage tub for the handling and storage of feature cards, and this may cost up to £60, depending on the type of feature card used. The true cost of establishing the system, therefore, is between £110 and £120, not £50. Adapting existing normal four-drawer filing cabinets for the purpose is not very satisfactory.

Finally, no one system can provide all the answers and our information control system is supplemented by author and source card indexes (5 in. × 3 in. cards), both of which, besides answering immediately any inquiry which specifies author and/or source, allow for limited browsing.

PRACTICAL APPLICATION OF 'FEATURE CARD' SYSTEMS. III

A. JOHNSON

Librarian, British Insulated Callender's Cables Limited

Co-ordinate Indexing Conference, London, 14th March 1963

OUR first excursion in co-ordinate indexing occurred on a modest scale in 1948 when we used it to index some correspondence that had hitherto provided somewhat of a headache to file and retrieve. We used a system of co-incident numbers entered on cards and found it delightfully simple and most effective. Not unnaturally our thoughts turned to other applications and we did in fact apply the idea to a file of corrosion literature using as ordinates the metal involved and the environment in which it was intended to use it. By this means it was simple to record or retrieve information on corrosion of several metals in common use in a variety of environments. This was, however, only an experiment, the natural corollary of which was to increase its application to wider fields of the technical literature. Those of you who have read my earlier article* will remember that I described our reluctance to depart from the more orthodox methods of documentation but how, after reading details of the ASTIA experiment, we decided to abandon classification and throw all our energies into building a co-ordinate index for the deep indexing of our technical reports. We decided that in view of the cost of obtaining the information contained in our reports we could well afford to spend both time and money in ensuring that we could retrieve it when it was needed. The circumstances in which we came to use the Brisch-Vistem '1000' card are given in my earlier paper together with other detail which it is unnecessary to repeat here. I should however like to say that our hopes have continued to be justified, and that since we began indexing the use made of our reports has increased by over 700 per cent. This in itself was a fair reward for our efforts and spurred us on to further applications.

About three years ago we decided to issue a Monthly Information Bulletin, each issue of which would contain approximately 250 abstracts covering a fairly wide field of interest. The abstracts for this Bulletin were first typed on to cards and each was assigned a number preceded by the two terminal digits representing the year. Two facts were immediately obvious: *i*, the depth of indexing applied to our technical reports was not justified for this medium and *ii*, the Brisch-Vistem '1000' card was of insufficient capacity for a possible 3,000 items per year. We therefore compiled a new dictionary of terms based on our earlier one but containing less specific entries—our reports dictionary contains about 2,800 concepts and the new one about half that number. We were not satisfied with the samples of ready-made cards offered to us so we designed our

* Johnson, A. Experience in the use of unit concept co-ordinate indexing applied to technical reports. *Journal of Documentation*, vol. 15, no. 3, September 1959, p. 146-155.

own. It has a capacity of 4,000 and measures 12 in. $\times$ 8 in., this size being chosen because of ease of filing when taken out of the tubs at the end of each year and filed 'blind' in standard quarto size filing cabinets—one year per drawer, four years per cabinet, cost about £16. When used in Carter-Parratt tubs these cards file thirty to a row and are arranged alphabetically from *right* to *left*. There is a very good reason for this. Bulletin abstracts plus additional items of information not included in the Bulletin add up to about 3,500 items per year, and at the end of each year we start a fresh series of cards for the next year's literature. An average search takes less than two minutes per 4,000 series—that is, per year.

Our latest exploit has been described by my public library friends as heresy and indeed, unless they have experienced work in a special library, they may be excused for so thinking. A major building operation involving the Library made it necessary to remove all the books from their shelves and in view of our success with co-ordinate indexing as applied to other material our minds naturally turned to its application to books. Before venturing further, however, we took a sample of our customers and asked them three questions: 'When you come into the Library do you come for a book or do you come for some information not knowing where you may find it?' 'Would you object to books being arranged in other than classified (UDC) order?'; 'Do you want to browse?'. The answers reassured us! Most users said they wanted information and the quicker they got it the better they liked it, whilst only a very few wished to browse. These few admitted that any order or arrangement would permit them to do this. The advantages offered by a purely numerical arrangement of books using unit-concept retrieval were many, including *i*, the utmost simplicity of shelving and re-shelving, *ii*, economy of shelf space (no gaps to leave for expansion of classes), *iii*, after initial stock has been shelved the unit-concept retrieval number provides an indication of age, and *iv*, retrieval of information is possible by untrained staff.

It is not however vital that the books be shelved serially in this manner. They can still be shelved conventionally provided that a card or catalogue slip is filed according to the unit-concept retrieval number and that this card or slip then indicates the shelf location. This involves an extra step but avoids departing, too far, from conventional shelving.

The system offers tremendous possibilities particularly for disclosing those snippets of information that lie in most unusual places and which hitherto have been pigeon-holed in the Librarian's mind and which when brought to light are classed as 'intuition' or 'experience'. To illustrate the point let me take a hypothetical case of a book entitled *The cat—its care and feeding*. This book may tell us that if you feed a cat with Vitamin X its coat will benefit and it may add that a peculiarity of this vitamin is that if fed to dogs their teeth will fall out. Here is important information on the feeding of dogs hidden away in a book on cats. Unit-concept permits us to 'post' vital pieces of information so that they will be revealed during a search. During the course of our own indexing we have in fact found information tucked away in the most unsuspected places.

Immediately we started indexing books we ran up against a new problem. This was to discriminate between information contained in monographs and that contained, say, in a chapter of a book which may be less informative. For

PRACTICAL APPLICATION OF 'FEATURE CARD' SYSTEMS. IV

DAVID G. SHEDDEN

Assistant to the Information Officer, Dowty Rotol Ltd

Co-ordinate Indexing Conference, London, 14th March 1963

THE system, devised initially to satisfy the needs of our Test Department, sought to locate, in the shortest possible time, vital information from a backlog of about twelve thousand reports, together with current additions. The main object was to reduce the number of technical man-hours involved in searching for the answers to questions posed by management, other departments and firms. It was also required to avoid the duplication of previous tests and provide any previously found information before the commencement of a new test programme. From experience gained with the reports already indexed, it is apparent that these aims are being fulfilled.

After investigation of the main classes of system it was decided to adopt a system using body-punched cards. The choice was influenced by the fact that there was already available all the normal International Computers and Tabulators equipment which is used for wages, accounting, stock control, etc. It must be emphasized that the specialized equipment available is not essential to the operation of our information retrieval system, but its use eliminates certain time-consuming tasks. The one essential is the hand-punch which is cheap to hire or buy and its use is readily mastered. All the cards used are standard ICT 80-column cards overprinted to our own requirements, the colour simplifying the identification of the role of the card. Basically, four different cards are used—the yellow and orange series and document descriptor cards, an abstract card, and a record card. It is obvious that in an 80-column card the number of available punching spaces is strictly limited. To be specific, columns 31–80 only are used for identity of documents. This gives five hundred holes; by interstage punching between the rows the number is increased to one thousand. Batches of cards for each thousand documents are given a co-ordinate series number relating to the drawer in which they are kept. By having a set of feature cards of a different colour where the holes relate not to a single document but to a series of one thousand documents, and by first searching on these cards to direct the search to the particular drawer or series, the capacity of the system is increased to one million documents.

The first thirty columns of the card serve a completely different purpose. Columns 23 to 31 carry required details in code form for sorting and identification and the first 22 columns are used for an extended feature field. This can best be illustrated by the classic example of the three features often related to a desirable male i.e. tall, dark and handsome. If this male were to be indexed under our system he would be a person or document number in a crowd or series of one thousand people or documents. In a search for this person the

feature cards tall, dark, handsome, would each have his number punched in the document section.

In the first part of the card—the extended feature section—the ‘tall’ card would have the holes referring to dark and handsome punched; the ‘dark’ card, the holes referring to tall and handsome, and so on. If the three feature cards are superimposed no holes would be showing, indicating that no further feature would narrow the search, while if any two were superimposed, the hole indicating the third would show. This principle is exactly the same for our own extended feature field, except that it is possible to have up to eighteen different features. When all holes are filled in the extended feature section, then the addition of any further feature will not narrow the search.

To retrieve information it is necessary to extract as many features as possible from the inquirer. Both the yellow (series) and orange (document) cards are removed from the store where they are kept alphabetically by feature. All the series feature cards are then stacked and it is hoped that only one series of one thousand document cards is indicated. If more than one, one has the choice of looking in the extended feature section of the cards to determine which questions can be asked of the inquirer to limit the range, or one can stack the document cards of several series in turn. Assuming that only one series remains, the document descriptor cards for that series are then stacked. The hole or holes that show through this are read directly by their co-ordinate references which refer to the abstract cards, kept in numerical order by series. Conveniently, two series fit exactly into standard punched-card trays. Knowing the series number from the search on the yellow series cards, and the document number from the orange document cards, one can go directly to the appropriate abstract card to verify that the report found is the one sought. The abstract card bears the document and series number and the report number, as well as a brief abstract of the report, so that one is directed straight to a report which is filed numerically in its own sequence.

The interesting role of the record card (the card that we hope never to have to use) will now be described. The data processing equipment does not sense normal and interstage punching simultaneously and so it is safe to use each stage for a completely different purpose. On this record card interstage punching is used for document, report and series number only. Normal stage punching is used to keep a record of every descriptor indexed from the particular report. For this purpose every feature is allocated certain columns on the record card, and each descriptor is given a code number to be punched in the appropriate columns. Now in the unfortunate event of the loss of one, or some, or in fact all, of the yellow or orange cards, it is only necessary to take the record cards to a sorter, sort in the columns relating to the lost feature and so find all the record cards on which each of the descriptors appears. From the co-ordinate numbers used for each document, it is then simple to produce the required new yellow or orange cards.

There are only two major points arising from our handling of reports which have come to light. The first is the use of role indicators. It has been found that these can lead to confusion and they have been dropped from the ‘component’ feature, although retained on the ‘service’ feature. These role indicators are

Used ON, and Tested. For the personnel feature, the role indicators have never been used but would have been Author, Instigator of test, Visit by, Visit of, etc. The second point is that the allocation of space on the record cards could have been improved, so that duplication of record cards could have been reduced when several descriptors were used in one feature field.

I shall now pass from the manipulation of the cards to a brief account of indexing the reports. After a report has been approved and published, the file copy comes to the indexing section where it is passed to an abstractor who reads it, produces a very brief summary and writes down the subject and purpose of the test in a fairly standardized form. The descriptors to be coded are also decided, and all this written out on a duplicated sheet. The report is given the next document number serially. The abstract card—pre-punched with document and series numbers—then has the report number punched in, before being passed with the summary sheet to the typists, who are conversant with our requirements of spacing and so on. The report is then filed and further working is done from the abstract card. The actual coding is normally done when several new reports have been written—to economize in time—since often the same descriptor cards are required for several reports.

Actual coding has now been fairly standardized so that with reasonable intelligence, familiarity with the hand punch, and a fair knowledge of how the system works, the job is on the whole automatic. Provided that there are no mistakes in the punching and that a certain pattern is followed, one cannot go astray.

Should a new descriptor be required, yellow and orange descriptor cards are produced containing the feature code in columns 23–30 and also the series code on the orange document card. A plain card has the heading punched in it, from which the card heading can be postprinted on to the document and series cards. These plain cards are also used for the occasional compilation of a sort of accession register, or schedule of descriptors, for record purposes.

We have found that the original aims of our information system are being fulfilled. Retrieval time varies inversely with the number of feature cards being sought, since we wish to attain low recall with very high relevance, and averages about three minutes from the normal number of features that can be supplied by the inquirer.

DISCUSSION ON AFTERNOON SESSION

Mr A. E. Cawkell (Dawe Instruments & Cawkell Research and Electronics Ltd) stated that he had been using a co-ordinate system quite successfully but appealed for wider dissemination of the kind of information which had been given at the conference, and suggested that a book incorporating this information ought to be produced for users of such systems.

Mr D. R. Curry (Overseas Geological Surveys) made the following points:

1. The choice of feature cards should be related to the field of interest, and the users. There was difficulty in determining how basic the terminology should be. If a subject specialist wished to browse, the index should be intelligible without a code book.
2. In a Peek-a-boo index, the waste material could easily be rejected if the terms were immediately accessible in abstract form.
3. Uniterm cards were always illustrated with a few numbers and matching items circled. Were they so easy to use in practice?

The Chairman pointed out that it was just such problems as those implied in item 1 which had caused workers in the United States to resort to such devices as 'semantic factoring' in order to provide for all possible levels of approach.

Mr D. Stanley (Standard Telecommunication Laboratories Ltd) said that as an experiment his organization installed Uniterm co-ordinate indexing in January 1962, as a replacement of UDC for certain classes of material. Up till now, the serial numbers allotted to each item had been posted on to Uniterm cards; punching holes in sheets was now being adopted instead. They had found no undue difficulties in matching the cards for common numbers although admittedly it was easier to match with punched sheets.

Mr Fairthorne said that theory—which the conference seemed to reject, in favour of learning in an unnecessarily hard (and extravagant) way—yielded a good test for suitability on information/theoretical grounds; he had called it 'Hume's Criterion' because it was in a footnote to his *Essay concerning the populosness of ancient nations*. In brief, an attribute was suitable as a descriptor if—and only if—not having this attribute was of equal interest, in the given context, with having it. For instance, it might be that sometimes not being male, i.e. being female, would be a feature of interest in its own right. In such contexts, whatever they might be, 'of or appertaining to maleness' would be a suitable descriptor. On the other hand, 'of or appertaining to Fairthorne' would be suitable only for a collection dealing with the Fairthorne family history. In other contexts most or all things neither belong nor appertain to Fairthorne. Hume pointed out that, in activities and social environments with established vocabularies, such correlated notions could be spotted because they had distinct names, e.g. 'soldier' and 'civilian', but no special name for 'not a seaman'. Only to a seaman was the last distinction important, and he used a special name, 'landlubber'.

Mr Snel said that in the afternoon papers (with the exception of Mr Boyd's), the co-ordinate indexing had been made to appear complicated, which was not the case. On the contrary, it had a pleasant natural simplicity. Questions could either be asked specifically or they might be put generally, and the replies were according to the requirements. Confusion of words in a wordlist could be avoided if the wordlist were restricted to a given field, such as petroleum technology.

The Chairman commented that the impression given by several speakers, including Mr Snel, was that the control of vocabulary was no problem. He could not personally accept this, for such problems as synonyms and class inclusion had already existed when we were concerned with conventional systems which handled only one term, or very few terms, at a time. Though the use of terms in combination might in itself be sufficient in some cases to determine the meaning of individual terms through provision of context, it was by no means always so. On the contrary, compounding of terms each of which had its own problems could only aggravate, not alleviate, the overall problem.

He said that Mr Boyd in his article in *Engineering* had shown how his vocabulary was restricted to a small number of terms by the use of 'standard' terms, each of which served for one or more additional terms. Thus the two words 'big' and 'end' for the 'big end' of an internal combustion engine would be entered in the system as 'high' and 'last'. This practice was obviously perfectly satisfactory when we were concerned with merely making a statement in a standard language, and we did not need to be convinced that this was workable—any standard word list or coding was capable of this. The trouble arose when it was not possible merely to substitute one label for another, and when it was desirable to provide for generic searching, etc. Assuming that we should want to 'generically encode' big ends as 'bearings' and 'crankshafts' we should have to make special statements in our dictionary such as 'big *see* high', 'end *see* last', 'high: when used for big ends post on bearings and crankshafts', 'last: when used for big ends post on bearings and crankshafts'. Alternatively we should have to admit the expression 'big ends' to the dictionary, with the necessary references, for the purpose of control.

Clearly there was a whole range of kinds of vocabulary, with, at one end of the spectrum, those providing for information which was quantifiable, such as heights and weights in personnel records, and at the other end those catering for the terminology of fields such as social science where terms were much less precisely defined.

Mr Boyd replied that where posting to another term was justified this would be done, including the posting of 'big ends' to bearings, etc.

Mr Snel reiterated that there was no difficulty in vocabulary control within a particular field and that within the field of petroleum technology no such problems had arisen.

Mr Moss said he thought structure was not essential in the vocabulary: in fact it created unnecessary complications. The relationship of keywords to other keywords in his experimental vocabulary could be shown in simple diagrams dealing with particular special subjects.

Mr Johnson referred to Mr Curry's question as to how basic terminology should be. The way in which the concept 'spectrographic analysis' should be stated had been considered, and whether all the basic terms which in combination might be said to describe the subject should be used. His practice was to use accepted terminology for such subjects; in this particular case there was a main card for 'analysis' and a subsidiary card for 'spectrographic analysis', both of which would be punched, together with whatever other cards might be relevant, including of course the card representing the substance analysed (e.g. 'copper').

Mr Shedden, replying to Mr Snel's mention of unnecessary use of complicated equipment, pointed out that the schedule of terms comprising his vocabulary had been produced by feeding cards which already existed into a high-speed printer to which he had access but whose purpose was normally to serve needs quite different from his own. One could not justify the use of a typewriter, which Mr Snel had suggested, when the wherewithal existed to print 300 lines of 80 characters per minute without any additional work.

Mr M. J. R. Healy (Rothamsted Experimental Station) asked if those with experience would like to comment on the Chairman's remark that requests for information by logical sums, i.e. on either A or B, and by logical differences, i.e. on A but not B, were not often met and therefore not usually provided for.

Mr Fairthorne replied that many American installations and devices could or did search according to complex specifications. For instance, Western Reserve University, using a GE225, handled specifications involving up to three levels of Boolean functions. It did so for expediency, not because it believed complex specifications to be desirable or necessary. Moreover, these specifications were already couched in a special restricted language. With current equipment under current demands, it might be quicker to select according to the complex specifications, than first to convert this by computer to, say, a union of intersections (sum of products). But complicated specifications were not only costly; they were self-defeating. As he had said earlier, only by rare chance were ordinary verbal statements so directly associated with sets of documents that a conjunction of such statements corresponded with the intersection of the sets. Still less directly did a complex Boolean function formed by joining *statements* with logical connectives correspond with the set formed by the formally equivalent set operators acting on *sets of documents*. Formal equivalence and empirical equivalence were very different things. For a summary of some theoretical work in this basic topic, done at the WRU Center, he referred to 'Inefficiency of the use of Boolean functions for information retrieval systems' by J. Verhoeff, W. Goffman and J. Belzer (*Communications of the Association for Computing Machinery*, vol. 4, no. 12, December 1961, p. 557-8, 594).

The Chairman pointed out that it was possible, even with the simplest systems, such as Peek-a-boo, to carry out such searches. Logical sums could be catered for by using either one or the other of the relevant cards in the deck to be interrogated. Logical differences could be handled by stacking card A, noting the relevant document numbers, substituting card B for A, noting the document numbers and deleting these numbers from the first list.

Mr Wall commented that the four speakers at the afternoon session had evolved practical co-ordinate systems which they regarded as fully satisfactory for their purposes. However, they had apparently employed indiscriminate mixtures of generic and specific terms. It was not generally realized that, when such a mixture of terms was used, the cards had to be permuted in order to answer a subject question; i.e. the cards for each successive level of generality had to be taken, one by one, and each compared with all the specific feature cards. If more than one 'family' of terms were involved, this activity became quite complex, and was indeed unacceptable in a manual system.

Mr C. W. Cleverdon (Aslib Cranfield Research Project) stated that much of the disagreement during the meeting had been due to the fact that speakers were arguing from different viewpoints. If it was found that a particular indexing system operated satisfactorily for a certain organization, then obviously there was no reason to find fault with it. However, it was unjustifiable to make the claim (as some speakers had done) that the same system would necessarily

operate satisfactorily in all other situations. There were obvious differences where one organization demanded a high recall figure, and was relatively unconcerned about the relevance ratio, while another organization was more interested in having a good relevance ratio. Certain indexing devices were available which could bring about either of these situations, but it was unlikely that any of the operating systems discussed in the afternoon session would satisfactorily meet both these requirements.

Mr Boyd said he agreed with Mr Cleverdon that existing satisfactory systems need not be changed or criticized. He did not think anyone would claim that feature indexing was a universal panacea, but it certainly had some interesting possibilities which were worthy of study. On the matter of recall versus relevance, the feature system could be designed from either viewpoint, or for any compromise between the two. In his own system, Mr Boyd had provided for a high recall figure, and brought the relevance ratio to the desired level by manual sorting.

The Chairman thanked the speakers for their very useful and informative contributions and added that the very great interest in the subject was reflected in the size of the audience. It was gratifying that the discussion had been sustained at a proper level, for it was very easy for discussions on an issue so controversial as this to degenerate into pointless argument. There was obviously a great deal of difference of opinion on the principles and applications of co-ordinate indexing systems, and the conference had served a useful purpose in providing an opportunity for putting forward different points of view.

Letters to the Editor

MONITORING CURRENT TECHNICAL INFORMATION

Dear Madam,

I find some of Mr E. J. Coates' letter on Monitoring Current Technical Information (in *Aslib Proceedings* for April 1963) almost incredible. He says 'Because they [abstracts] are intended for perusal, subject index signposting occupies a comparatively low place in their scheme of priorities'; this is simply not true.

Abstracts are intended both for current awareness and for retrospective searching, and it is of course true that for them to be used for either purpose they must be perused. I doubt, however, if anyone reads solidly through an abstract bulletin; what usually happens is that for current awareness the user reads the titles in the sections that interest him, and when he finds a title that seems to indicate a subject of importance he reads the abstract. For retrospective searching the title is of little value; the abstracts turned up from the subject (or other) index are studied.

The BTI is of course right to attach first importance to the currency of entries, since it is essentially a tool for current awareness, but for retrospective searching a different approach is needed, and one has only to look at the index volumes of, say, *Chemical Abstracts* to realize that neither Mr Coates' nor Mr Cemach's arrangements are adequate.

Yours faithfully,

A. H. HOLLOWAY,

*Head of Admiralty Centre for
Scientific Information and Liaison*

Admiralty, Room 2304,
Empress State Building, London SW6
14th May 1963

KEYWORD-IN-CONTEXT INDEXES

Dear Madam,

With reference to Dr Dyson's letter (in *Aslib Proceedings* for May 1963), I must confess that I used the expression 'an index to *Chemical Abstracts*' rather loosely.

My 'error' in stating that *Chemical Titles* started in 1961 is well shared. Our subscription started with the 5th January 1961 issue, which we took to be the first. This issue bears the caption 'Number 1'. On checking further, I now find that January 1962 and 1963 both have 'Number 1's'. All holdings lists I could check stated 1961 as the commencement date, and the most recent edition of Ulrich confirms my error.

The issue has been obscured by Dr Dyson himself. I have just seen an article written by him in the *Data Processing Annual* for 1960 in which he states on p. 188:

'*Chemical Titles* was announced at the Society's 137th national meeting in Cleveland, Ohio, in April, 1960 and about eight or nine experimental issues, distributed free of charge, are planned for 1960. It will become an official publication of the American Chemical Society on January 1, 1961 when it will go on a regular semi-monthly schedule.'

Yours faithfully,

J. D. BLACK,
Manager, Laboratory Communications

IBM British Laboratories,
Hursley Park,
Winchester, Hampshire
23rd May 1963

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

Books and Pamphlets

AMERICAN BOOK PUBLISHERS COUNCIL, INCORPORATED [and] AMERICAN TEXTBOOK PUBLISHERS INSTITUTE, INCORPORATED
Book publishing in the U.S.S.R.: report of the delegation of U.S. book publishers visiting the U.S.S.R., August 20-September 17, 1962 . . . New York [1963]. vi, 112 p. \$2.00.

AMERICAN CHEMICAL SOCIETY. 143rd national meeting, Cincinnati, 1963
Development and use of records in the processing of technical papers in an industrial organization [by] E. F. Dirksen [preprint of paper presented before the Division of Chemical Literature] [Cincinnati, Ohio, 1963]. 5 p. diags.

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES
Biological Sciences Communication Project
Page cost policy of biological journals, by Charles W. Shilling. Washington, DC, 1963. Various paging. tables. diags. (. . . communiqué 9).

AMERICAN STANDARDS ASSOCIATION
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BRITISH CERAMIC SOCIETY
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MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 5 Stratton Close, Hounslow. Hounslow 6954.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Roumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

Appointments vacant

CHEMICAL LITERATURE. Young lady with science degree, preferably in chemistry, required by international research organization to undertake literature screening and documentation. Location London. Reading knowledge French and German essential. A similar position may shortly become vacant in Washington, DC, USA. Please reply giving full details, stating whether interested in both locations. Box no. 663.

INFORMATION ASSISTANCE. A. Boake, Roberts & Co. Ltd, Chemical Manufacturers, have a vacancy for an Information Assistant in their Research Library. The work involves the indexing of reports, dissemination of information and some typing. The position will appeal to a young lady with an interest in Chemistry and who has reached GCE 'A' or 'O' level in Chemistry and English. Some previous library experience would be an advantage. Please apply Personnel Manager, 100 Carpenters Road, Stratford, E15. Telephone: Maryland 5511.

LIBRARIAN required for technical library serving computer and electronics research and development laboratories. Professional qualifications preferred but not essential. Previous industrial experience an advantage. Excellent working conditions in modern building and good rate of pay. Please apply to the Personnel Officer—Women, Ferranti Ltd, Western Road, Bracknell, Berks.

LIBRARIANS (Grade IV) in GOVERNMENT DEPARTMENTS. Pensionable posts in the following Departments for men or women at least 22 on 1st June 1963 who have passed Registration Examination of the Library Association or who hold London University Diploma in Librarianship. Unless stated otherwise, posts are in London: (a) Ministry of Agriculture, Fisheries and Food;

(b) Ministry of Aviation; (c) Signals Research and Development Establishment (Ministry of Aviation), Christchurch, Hants; (d) Colonial Office; (e) Commonwealth Relations Office; (f) Government Communications Headquarters, Cheltenham; (g) Central Office of Information; (h) H.M. Stationery Office; (i) Anti-Locust Research Centre (Department of Technical Co-operation); (j) Board of Trade; (k) Army Central Library (War Department); (l) Royal Military Academy, Sandhurst, Camberley, Surrey (War Department).

For (c) an interest in the field of telecommunications and electronics is desirable; experience in this field is also desirable, together with a knowledge of foreign languages, for post (f). Post (g) requires a thorough knowledge of bibliographical sources and sources of information on the work of public bodies. Knowledge of Government Departments, and their publications, is essential for post (h), as is the ability to take sole charge of the reorganization of H.M. Stationery Office's cataloguing service. Post (i) requires an interest in biology and some scientific background. For one of the posts in the Board of Trade a reading knowledge of foreign languages is an advantage. For one post in the Royal Military Academy, Sandhurst, a knowledge of and interest in history or a related subject would be an advantage; for the second post preference may be given to candidates with scientific background or knowledge. Starting salary (Inner London): £746 (at 22) to £874 (at 25 or over) or, possibly, higher for candidates aged 26 or over. Scale maximum £1,296. Promotion prospects. Write Civil Service Commission, 23 Savile Row, London W1, for application form quoting 5676/63/7. Closing date 28th June 1963.

NATIONAL MARITIME MUSEUM, GREENWICH: ASSISTANT KEEPERS. Two pensionable posts for men or women at least 20 on 1st June 1963, normally with 1st or 2nd class honours or post-graduate degree. One post requires library experience and knowledge of maritime history; experience in historical research desirable. For the other post, the degree should be in a scientific or mathematical subject; knowledge of navigation or astronomy and interest in maritime affairs essential; knowledge of Arabic and of history of science desirable. Knowledge of European languages an advantage for both posts. Final year students may apply. Salary (Outer London) on scale £800-£1,359 or £1,488-£2,539 according to age, qualifica-

tions, and experience. Starting salary may be above minimum on lower scale. Write Civil Service Commission, 23 Savile Row, London W1, for application form quoting 5687/63. Closing date 27th June 1963.

SCIENCE LIBRARIANS: BRITISH MUSEUM. Four pensionable Assistant Keeperships in Department of Printed Books for work in connection with National Reference Library of Science and Invention; open to men and women at least 20 on 1st June 1963, with 1st or 2nd class honours or post-graduate degrees. Final-year students may apply. For two posts, degree must be in science or mathematics, and interest in the ordered arrangement of scientific and technological subjects is required. For the other posts, a reading knowledge of Russian, or of Japanese or Chinese, and an interest in science are essential. Inner London salary scale £835 (£825 if aged 20)–£1,369 or £1,498–£2,544 according to age, qualifications, and experience. Starting salary may be above minimum on either scale. Promotion prospects. Write Civil Service Commission, 23 Savile Row, London W1, for application form, quoting 131/63. Closing date 26th June 1963.

TECHNICAL LIBRARIAN, male or female, required for a small but expanding library now located in Manchester but soon to be moved to Macclesfield. Previous experience of similar work is essential and a Library Association or equivalent qualification would be desirable. A knowledge of Russian or German could be an advantage. Applicants should have a keen interest in classification and in making use of the contents of the library. Five-day week, superannuation scheme. Salary according to age, qualifications, and ability. Write to Director of Research, Machine Tool Industry Research Association, 163 Kingsway, Manchester 19.

ARCHITECTS' CO-PARTNERSHIP require a qualified librarian with technical library experience to run single-handed an office of technical information. Salary at about £900 according to experience. Apply 44 Charlotte Street, London W1.

ASSISTANT INFORMATION OFFICER to join the staff of MSL, specialist consultants in management succession and selection. The Information Office forms a vital link in these services by maintaining and interpreting background information—much of it confidential—on industries, companies and management, at home and overseas. She must be under 35, and have some experience of industrial information work; equally important are an inquiring mind, good humour and a sense of personal responsibility.

Degree an advantage. Starting salary up to £900, plus bonus and luncheon vouchers. Five-day week in congenial surroundings. Please send details of education and experience, in confidence, to R.A. Denerley, Management Selection Limited, 17 Stratton Street, London W1.

THE UNIVERSITY OF SHEFFIELD: POSTGRADUATE SCHOOL OF LIBRARIANSHIP. Applications are invited for the post of LECTURER in SPECIAL LIBRARIANSHIP (SCIENTIFIC AND INDUSTRIAL LIBRARIES) to begin duties on 1st January 1964. Initial salary according to qualifications and experience on the scale £1,250 × 60–£1,670 × 80–£2,150, with F.S.S.U. provision and family allowance. A grant towards removal expenses will be made. Candidates should be graduates in science or technology and should have had extensive experience of work in scientific or industrial libraries. Further particulars may be obtained from the Registrar to whom applications (four copies) should be sent by 6th July 1963.

TECHNICAL ASSISTANT

is required by

THE BRITISH ALUMINIUM COMPANY LIMITED

in its Intelligence Department to deal with technical inquiries and editorial work on *Aluminium Abstracts*.

Graduates with knowledge of languages preferred.

Applications to the

**Staff Manager,
British Aluminium Co. Ltd.,
Norfolk House,
St. James's Square,
London, S.W.1.**

Aslib Proceedings

incorporating Aslib Information

*The Role of Market Research in
the United Kingdom Chemical
Industry*

H.P. HODGE

*Local Access to the Aerospace
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MELVIN S. DAY

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Aslib Proc. vol.15 no.7 p.201-221 London, July 1963



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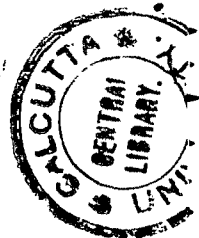
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ASLIB PROCEEDINGS

incorporating Aslib Information



Volume 15

July 1963

Number 7

ASLIB CALENDAR 1963

September

THUR.12. Technical Translation Group meeting at Aslib, 3.30 for 4 p.m. 'Alphabets of difficult languages', by R. Sewell.

TUE.24 - THUR.26. 37th Annual Conference at St Andrews.

October

TUE.15. Chemical Group sherry party at Aslib.

THUR.17. Technical Translation Group meeting at Aslib.

TUE.22. Evening meeting at Aslib, 5 for 5.30 p.m.

November

THUR.7. Technical Translation Group sherry party at Aslib.

THUR.21. Evening meeting at Aslib, 5 for 5.30 p.m.

Miss Joan Hunt

We have to announce with great regret the death, on 14th June, of Miss Joan Hunt. Miss Hunt was a personal member of Aslib and had been a familiar visitor to headquarters since 1959, attending meetings and regularly using the library.

Honorary Officers of Aslib

Members will be pleased to know that Lord Shackleton of Burley has consented to serve as President of Aslib for the coming year. He succeeds Sir Lindor Brown, whose term of office has expired. Sir John Wolfenden, who ceases to be Vice-Chancellor of the University of Reading later this year on taking up his appointment as Chairman of the University Grants Committee, has been elected a Vice-President. Both Lord Shackleton and Sir John have already taken an active interest in Aslib's affairs.

Mr Gordon Weston has been elected Honorary Treasurer for a fifth year, and Mr D. T. Richnell Honorary Secretary for a fourth year. The Council is indebted to both these members for their very great interest in Aslib's welfare.

Council Elections 1963

Mr L. G. Patrick, of Aluminium Laboratories Ltd, is welcomed as the Chairman of Council for 1963-4. So is Mr R. L. Collison as Deputy Chairman.

The following members have been elected to the Council as a result of the postal ballot for the nine available places:

Mr Julian Blackwell (B.H. Blackwell Ltd, Oxford)

Mr A. C. Bubbs (Royal College of Advanced Technology, Salford)

Dr D. J. Campbell (Pressed Steel Ltd)

Mr B. Agard Evans (Ministry of Public Building and Works). Individual Member

Miss M. Gosset (Atomic Energy Research Establishment, Harwell)

Mrs Joyce Lancaster-Jones (The British Council). Individual Member

Mr F. Liebesny (The British Aluminium Co. Ltd)

Mr G. M. Paterson (Lyon Playfair Library, Imperial College of Science and Technology)

Mr F. R. Taylor (Manchester Public Libraries).

There were eighteen candidates and voting papers were received from 484 members.

Dr T. E. Allibone

Congratulations are offered to Dr T. E. Allibone, FRS, on his appointment as chief scientist to the Central Electricity Generating Board. Dr Allibone is a DSIR Visitor to Aslib and until recently was Director of the Associated Electrical Industries Research Laboratory at Aldermaston. He will take up his new appointment on 1st October.

Film Cataloguing Rules

Film Cataloguing Rules has been compiled by the Aslib Film Production Librarians Group Cataloguing Committee to meet the need for standardization

of cataloguing procedures in all libraries where film is handled. The *Rules*, published by Aslib at the end of June, cover the descriptive cataloguing of complete films, newsfilms, picture material, and sound material; they are also designed to give special help in the use of technical terms, and they incorporate, for example, a list of definitions and a list of abbreviations. *Film Cataloguing Rules* is available from Aslib, price 18s (price to members of Aslib, 14s) and a descriptive leaflet and order form is enclosed with this issue of *Aslib Proceedings*.

Biological Group

A new Aslib Group, the Biological Group, has been formed, and all Aslib members interested in the biological field will be very welcome to join. It is hoped to hold the first meeting in October; possible themes will be 'Biological information services' and 'Classification of biological literature'. Requests to join the Group are cordially invited, and should be addressed to the Liaison Officer at Aslib.

Fuel and Power Group

The Fuel and Power Group has not been active for some time. At its Annual General Meeting in May the members agreed that 'the Group's activities should be suspended until sufficient of the membership requests the appointment of a new Committee'.

Information Courses

Further two-day 'appreciation' courses have been announced for 1963 by Messrs J.L. Jolley and Partners Limited. The overall theme is methods of handling information, and special emphasis will be placed on co-ordinate indexing methods, which will be compared and contrasted with others, and related to the equipment available. There will be opportunity for practical work in developing indexing systems.

The courses will be held on Wednesday and Thursday 18th and 19th September, and Wednesday and Thursday 13th and 14th November, at the Bell Inn, Aston Clinton, Buckinghamshire. The fee will be 16 guineas. It is advisable to make reservations as soon as possible, and all inquiries should be addressed to J.L. Jolley and Partners Limited, 46-48 Frogmoor, High Wycombe, Buckinghamshire (telephone High Wycombe 2630).

Universal Decimal Classification

A second revised edition has been published of *Universal Decimal Classification for use in polar libraries*; compiled by B. Roberts (SPRI occasional paper no. 2: FID official publication no. 348). This is the joint publication of the Scott Polar Research Institute, Cambridge, the Fédération Internationale de Documentation, and the British Standards Institution.

UDC has been in use in the Institute since 1945, and this 185-page publication represents the expansion of sections of special polar relevance. It has been compiled from eighteen years of practical experience in the library of the Institute, and supersedes the mimeographed *Abstract of the Universal Decimal*

Classification for the use of the Scott Polar Research Institute, Cambridge (1950) with supplements (1950-1956), and the *Abstract of the Universal Decimal Classification for use in polar libraries* (1956) with supplements (1957-1963).

It is available from Mr H. G. R. King, Librarian, Scott Polar Research Institute, Lensfield Road, Cambridge, price one guinea. Ensuing annual supplements will be issued gratis on request from subscribers to the full edition.

Association for Computing Machinery

The 1963 Conference of the Association for Computing Machinery will be held from 27th to 30th August in Denver, Colorado. The speakers will include scientists and teachers from the United States and other countries; there will be fourteen broad subject categories including language and learning, bio-medical programming and processing, and education and programmer training. One of the panel discussions will be 'Social aspects of computing: the responsible use of computers in politics'. Further information about the Conference may be obtained from Mr Roger P. Hansen, Public Relations, ACM National Conference, P.O. Box 81, Denver 10, Colorado, USA.

International Congress on Reprography

The First International Congress on Reprography will be held in Cologne from 14th to 19th October 1963. The participants will include scientists and experts in facsimile document reproduction processes from all over the world, and there will be a large-scale industrial exhibition on display; preliminary details were given in *Aslib Proceedings*, vol. 14, no. 4, April 1962. The Congress fee is DM 55. Details of travel and accommodation and copies of the Congress programme are obtainable from the Deutsche Gesellschaft für Photographie e.V. (German Society for Photography), Neumarkt 49, Cologne, Germany, and applications to attend the Congress should be made before 31st August.

The *Proceedings* of the Congress will be published during 1964, and information about them can be requested from the publishers, Verlag Dr Othmar Helwich, Hoffmannstrasse 59, Darmstadt, Germany.

Directory of Photocopying and Microcopying Services

The FID has published, with the assistance of Unesco, the third and revised edition of *Photocopies from abroad* (FID publication 347). The guide is based on an international survey carried out in 1962 of the reproduction services offered by national institutions. The majority of services listed do not go beyond supplying copies from their own collections, but there are others in a position to trace the required document and to have it reproduced. All have been selected according to their preparedness to serve customers abroad; they are arranged in alphabetical order of country, the countries being ordered according to UDC. The directory is available from FID, 7 Hofweg, The Hague, Netherlands, price 5 guilders.

Enlarged Prints from Library Microforms

The Library Technology Project of the American Library Association has

published the latest in its series of studies into library equipment and supplies, *Enlarged prints from library microforms: a study of processes, equipment, and materials* (LTP publication no.6). W.R. Hawken reports the findings of a study of the reader-printers now on the American market which might have library application. Eight basic machines are evaluated in detail and current print-out devices unsuited to library purposes are discussed with suggested improvements. The situation with respect to reader-printers for library use seems, by and large, a disappointing one. Most of the machines tested fail to qualify; the reasons for this are summarized in detail and form a valuable guide to librarians as to what to look for in a machine. The publication is available from the Library Technology Project, American Library Association, 50 East Huron Street, Chicago 11, Illinois, USA, price \$4.

Euratom-Information

The first issue has been received of *Euratom-Information*, a new official publication of the European Atomic Energy Community. This journal will be published at two-monthly intervals and intends to provide details of Euratom's activities in the scientific and technical field, i.e. research and development projects, contracts, and inventions patented. Its primary role, however, will be to serve as a periodical catalogue and abstracting service for all Euratom publications. Subscriptions of \$15 per annum may be arranged direct with Verlag Handelsblatt GmbH, Kreuzstrasse 21, Düsseldorf 4, Germany, or through HMSO, Agency Section, P.O. Box 569, London SE1.

Current Abstracts and Indexes

The Manchester Public Libraries Committee has just published an annotated holding list, *Current abstracts & indexes in the technical and commercial libraries*. Of the 3,000 periodicals taken currently in these two libraries, 291 were found to contain abstracts or indexing services as a regular feature. Full details as to the periodicity, coverage, cumulative indexes and arrangement of entries are listed in a standard format under sixteen headings for each of these titles, and an index of subjects mentioned in the titles of these services is appended. Together they serve as a key to the contents not only of the remaining 80 per cent of the 3,000 titles in the libraries, but also to the much greater number of titles published throughout the world but not represented in their collections. This publication is available from the Technical Librarian, Manchester Central Library, St Peter's Square, Manchester 2, price 10s 6d post free.

Survey of Scientific Manuscripts

The Standing Conference of National and University Libraries (SCONUL) is carrying out a survey of manuscript material in the field of science and technology from the eighteenth to the early twentieth centuries, and hopes to publish a subsequent guide to source material. The kind of material sought includes notebooks, diaries and working papers, letters, drawings and designs. Detailed descriptions of extensive collections are not required, but information on uncatalogued collections would be particularly valuable. SCONUL would

like to hear from any institution which has not yet been approached and which has relevant manuscript material. Further details of the kind of material and description required may be obtained from Mr A. E. Jeffreys, Assistant Librarian, University of Keele, Staffordshire.

Periodicals on Textiles and Clothing

The Manchester Public Libraries have issued an 8-page booklet *Textiles and clothing* which lists periodicals on these and allied subjects currently available in the Commercial and Technical Libraries. All periodicals are kept for a minimum period of three years and many are permanently filed. It is available free of charge from Mr F. R. Taylor, Technical Librarian, Manchester Central Library, St Peter's Square, Manchester 2.

THE ROLE OF MARKET RESEARCH IN THE UNITED KINGDOM CHEMICAL INDUSTRY

H. P. HODGE, B.SC., A.F.INST.PET., A.I.INF.SCI.

Manager, Market Research & Development Division, Esso Petroleum Co. Ltd, Chemicals Department

Aslib Chemical Group meeting, London, 3rd April 1963

THE term market research may well suggest an assortment of mental pictures. Some of you may visualize an attractive young woman armed with a questionnaire and going from door to door asking questions about detergent powders. Others perhaps will picture a statistician plotting points on a graph and extrapolating them for future years. Both certainly have some application to market research, in its broadest sense, but I intend to discuss industrial market research, which poses and attempts to answer a more complex set of questions.

Dealing specifically with market research in the chemical industry (although what I shall describe here could equally well apply to many other industries), market research defines or attempts to define the following facts concerning the chemical under study:

1. The size of total market—past, present and future.
2. The production of the chemical locally, and the capacity of the manufacturing plants, now and in the future.
3. The volume of exports from and imports into the local market, with forecasts of future trends.
4. The competitive position—who are the manufacturers and suppliers? What alternative products can compete? What is the extent of the captive market?
5. The present and likely future share of the market which one's company can expect.
6. Current price levels and future price trends.
7. Influence of duties, tariffs and quotas; and also the significance of trading communities like the European Free Trade Association or the European Economic Community.
8. Special market requirements necessary to insure the future success of the marketing operation.

Time will not allow a very detailed explanation of the techniques of chemical market research but I do want to concentrate on the question of the contribution which it can make.

Market research is an essential management tool which, in the complex and competitive situation of the chemical industry today, is the only logical alternative

for planning purposes to the business hunch—and I might add that even in earlier years the business hunch was frequently based on the type of information which now forms the market researcher's tools. Today no single executive can hope to encompass the complexity of market facts and figures in his own mind and steer a sure path to business success. By acting on the conclusions of market research, the executive team can minimize the commercial risk in existing or future operations—although in view of the dynamic state of the chemical industry today, we cannot hope to rule out all risk or expect to hit the nail on the head every time with our forecast.

Market research must be the first step before undertaking any new operation and the continuing means of measuring success in existing operations. Without detailed knowledge of the size of the market, the intent of competition, the factors affecting price trends and, above all, the likely growth, or otherwise, of the market in the future and industry's ability to supply it, no company can assess its likelihood of success in entering a new market or the effectiveness of its sales efforts in an existing one.

It should provide a regular flow of market intelligence to assist the sales groups to exploit all marketing opportunities. This day-to-day responsibility of market research is often overlooked by some market research groups who concentrate solely on the long-term picture. It must be flexible in its approach and capable of sifting and absorbing the constant flow of old and new facts to provide a continually moving picture on any product or industry.

It should provide the first sieve designed to sift out the more from the less promising proposals for new manufacturing projects. As a proposal proceeds along the channel of review, evaluation, and eventual decision, the market survey should become more definitive in scope to highlight the special marketing problems likely to be encountered and thus requiring close contact between the project evaluation group and the market research team. Nor should it be forgotten that this sifting process does not end here. Because of the changing conditions of the market, all manufacturing proposals and the chemicals involved should be regularly re-evaluated, in case a project previously rejected should take on a new importance.

Market research must therefore be kept constantly up-to-date. Unfortunately, the maximum value is not always made of good initial surveys because of failure to keep them under regular review. It must be quite fearless in its approach and all market trends must be honestly and promptly reported without any attempt to distort the picture.

Effective market research can also assist in providing a firm with a background against which to relate potential customer contracts for the supply of chemical raw materials or intermediate. It can provide evidence of the customers' likelihood of selling the end product to be made from the quantity of chemical intermediate he is proposing to buy. Doubts about his ability can be resolved before the contract is signed and will help to avoid contracts set at an unrealistically high level (which would force the supplier to extract penalties from the purchaser for low offtake below the contract minimum). This type of market research co-operation with potential customers is essential at the commencement of contract negotiations.

May I perhaps deviate at this point and say what I am quite convinced chemical market research is not. It is not:

- a. A 'one-shot' operation.
- b. A crash programme, or an afterthought to help justify a project already decided upon by management.
- c. A graphical extrapolation of historical data.
- d. A slide-rule operation by a desk-bound economist.
- e. A part-time assignment for someone with many other, more pressing responsibilities.
- f. A function to operate on a shoestring.
- g. Infallible.

Market research must be a planned, continuous, dynamic operation carried out by full-time, experienced, skilled and farsighted research personnel. Insufficient or poor quality market research in our industry will soon manifest itself in the company balance sheet. It is, in fact, a blend of all the skills of the chemist, chemical engineer, economist, and statistician with a good deal of logic and common sense thrown in. It requires not only an exhaustive study of all the published data on production, consumption and end uses of a chemical, but also a great deal of field work involving discussion with specialists in the primary industry making or using the particular chemical, and also in those secondary or related industries which rely on the derivatives as their raw materials for further conversion. This field work is generally the most important part of the whole survey and the part which results in the most valuable information on new developments, new markets and new moves by others interested in the same product. No one can determine a competitor's intentions by slide rule calculation; but, on the other hand, effective field contact can often uncover competitive plans long before any announcement reaches the press.

A necessary part of good research is an extensive and well-organized information system. The volume of statistical, technical, and economic data which a market researcher needs is so great that he must be properly supported by an information system to collect, cross-reference and file these facts. Too often this side of the work is given scant treatment and there must be more 'bottom drawer' information systems amongst chemical market researchers than in any other section of industry. The effectiveness of any market research effort will be directly related to the effectiveness of the information system available. Facts must be quickly located with the certainty that all the published data is there in the files, correctly documented, as a background to the detailed field work which will follow. Although I am sure it is quite possible to cater for the needs of the market research group via a central information system associated with, for example, the company's research centre, I believe that the market researcher's needs are sufficiently specialized to warrant a tailor-made information system for his particular use. Speed of retrieval and opportunity for the market researcher to make his own literature search are of fundamental importance.

In summary, I believe that chemical market research has three basic responsibilities.

1. It should be part of the management team and must participate in the

decision-making process by providing the market justification for plans for expansion in existing or new products.

2. It has a responsibility to the sales group not only in measuring the effectiveness of the present operation but also in pointing out the non-statistical factors, such as technical service, distribution, packaging, and competitive strategy, which influence performance.

3. Market research has a very real responsibility to research and development. In the case of market-oriented new product research, it should provide the incentive on which the research and development expenditure is justified, by indicating the potential demand for new products and the vulnerability of existing ones. At all stages, market research and research and development should keep in close touch, and even in basic research any promising new materials should be screened as early as possible by the market research group in order to identify the magnitude of the potential market and provide evidence for the need for an additional research effort.

In short, market research should provide the headlights of a chemical company's operations, not only in illuminating the mileposts of the immediate marketing achievements, but also in highlighting the new opportunities for growth which lie ahead.

LOCAL ACCESS TO THE AEROSPACE TECHNICAL LITERATURE

MELVIN S. DAY, B.S.

*Director, Office of Scientific and Technical Information, National Aeronautics and Space Administration,
Washington*

*Paper given at Aslib Aeronautical and Engineering Groups Annual Conference, Cranfield,
5th-7th April 1963*

THE CHAIRMAN, Mr R. C. Wright, Head of the Library at the Royal Aircraft Establishment, Farnborough, introduced Mr Day to his English audience by giving a brief outline of his professional background.

Mr Day was a chemist, he said, who had been connected with work on nuclear reactors as early as 1943; he had had military and industrial experience; had joined the United States Atomic Energy Commission in 1947, and in 1958 had been named Director of its Technical Information Service in Washington. His experience with the National Aeronautics and Space Administration had begun in 1960. He was a member of the Science Information Committee of the Federal Advisory Council for Science and Technology, of the Technical Information and Documentation Committee of AGARD-NATO, and of the Board of Governors, US Science Information Exchange; and had been United States delegate to conferences abroad, as well as currently being a member of prominent American societies such as the American Documentation Institute and the American Institute of Aeronautics and Astronautics. His writing has appeared in *American Documentation* and *La Revue de la Documentation*.

Mr Day had invited his audience to interrupt with questions during the course of his talk, which was thereby extended (with a short break) to over two and a half hours. Because of this, there was no formal discussion following the paper.

INTRODUCTION

It is both an honour and a distinct pleasure to be able to share with you this afternoon a few of my thoughts and experiences in the operation of an information-processing and reference activity. The concepts and approach I shall discuss are neither unique nor original and, I am sure, have been implemented very successfully in your own daily operations. Then 'Why', you may ask, 'should such a paper be presented?' Surely, the principles are known. Quite frankly, our only justification is one of scope of application—application both nationally and internationally. Many of you may have heard the delightful anecdote about Sir George Cayley.

Sir George, a brilliant engineer, invented the airplane almost a century before the Wright brothers made their first flight—in the sense that he discovered the aerodynamic principles of the airplane wing and the propeller. All that he

needed was an engine and the fuel to run it. In 1809 he said, 'I feel perfectly confident that aerial navigation will soon be brought home to man's convenience and that we shall be able to transport ourselves and our families and their goods and chattels more securely by air than by water and with velocities from 20 to 100 m.p.h.'

If I may draw an analogy, Sir George, unfortunately, was about one hundred years ahead of his time. You, on the other hand, are current with the needs and requirements of your time. In your libraries, figuratively speaking, you have already successfully applied the aerodynamic principles of the airplane wing and the propeller, and, what is more important, you have built an engine and you have the fuel to run it. My contribution will concern a larger structure, a larger engine, and the requisite fuel to power it. It will concern a broad information programme—international in scope and through which we are most anxious to be of service and help to you and your users.

It is my intention, as the title of this paper indicates, to place major emphasis where we believe quite strongly it belongs—on *local access* to items of needed information. Our view of local access encompasses all users from organizational to individual. We believe that the special libraries and information bureaux, such as your own, play a major role in serving as local access points for all individual users in their own service areas.

In order to point up this concept and perhaps enhance your perspective, I should like to give you an overview of what we attempt to do for our users at home. This will entail briefly describing our operating philosophy, tools, services and products, and our universe of users.

OBJECTIVES AND OPERATING PHILOSOPHY

All scientific and technical programmes of the National Aeronautics and Space Administration, whatever their specific objectives and accomplishments, have one common requirement and one principal product: knowledge. This knowledge is clearly vital to continued progress in the aeronautical and space sciences. It is equally—if less obviously—vital to all elements of society that in any way contribute to, or rely upon, technological advancement. In a very real sense, the scientific information deriving from NASA's endeavours is a critical world resource.

Information requirements internal to the NASA community can only be satisfied through an integrated, comprehensive system that provides ready access to any recorded knowledge that will assist or improve its technical programmes. In the same way, the external information requirements which NASA must satisfy can only be met by a system that ensures ready access—for science, for industry, for the educational world, and for the general public—to NASA-sponsored scientific knowledge appropriate to a given need.

The extent to which such information is made usefully available to the several user 'publics' which NASA serves is therefore a major measure of NASA's effectiveness. The key word here, of course, is 'usefully'. Mere availability of a vast and varied collection of data is plainly not enough at a time when the communication of scientific knowledge is, in itself, a most pressing scientific problem. NASA must ensure that its work and its findings are reported

both comprehensively and selectively; that *all* suitable information is provided to organizations and interests that can properly utilize it; and that *any* of its scientific information can be identified and made available, in a meaningful form, to specialized endeavours that in any way promote the national aeronautics and space programmes.

Finally, to avoid further compounding the scientific communication problem, the NASA programme for meeting the foregoing goals must be coherently related to the many other existing scientific information systems, both inside and outside the United States Government, and at the same time take cognizance of the benefits to be derived through co-operation with scientific and technical information systems in other countries.

The new NASA scientific and technical information programme is guided by five operating principles which merit identification and brief explanation. First, our products and services are designed for the ultimate consumer of knowledge—the scientist, the engineer, the laboratory worker, etc., so that his information requirements may be satisfied in those particular cases where no local services are available to him. Basically, however, we are committed to the thesis that the local special library or information centre functions as the integral link in the information chain to acquire and organize needed information, and provide that level of service which makes it unnecessary for its clientele to submit individual requests to large and remote centralized operations. You will note, I am sure, the intent here is to give the scientist and technician a choice: to maintain his own current literature awareness, to make his own literature searches, and to obtain his own information; or to rely upon a nearby local source which will do these things for him, and effectively.

Secondly, we recognize the element and need for timeliness in the acquisition and processing of information, in announcing its availability, and in distributing it to the users who need it most.

Thirdly, we recognize the critical importance of co-operation and collaboration with other existing information systems and services. The information explosion and its impact on scientific progress has made any other operating principle unthinkable. Unnecessary overlapping of coverage is not only uneconomical but acts as a direct deterrent to the required acquisition, control, and dissemination of a vast complex of scientific and technical information. Accordingly, our scientific information programme works continuously and closely with both governmental and specialized professional information organizations. Within the United States Federal family, for example, NASA collaborates with the Armed Services Technical Information Agency, the Atomic Energy Commission's Technical Information Division, the National Science Foundation, the Office of Technical Services in the Department of Commerce, and the Federal Aviation Agency, to cite but a few. Similar collaboration has already been established in many cases with abstracting, indexing, and related services that concentrate on the vast bulk of formally published journal literature. Close co-operation has already been established with the American Institute of Aeronautics and Astronautics, the American Meteorological Society, the Aerospace Medical Association, and with members of the National Federation of Science Abstracting and Indexing Services.

The extent of such tie-ins with other specialized technical information services may be illustrated by the recent agreement between the American Institute of Aeronautics and Astronautics and NASA. Historically, the Institute as part of its abstracting services published a first-rate monthly abstract journal, *International Aerospace Abstracts*, which provided partial coverage of the report and published literature in aerospace science. With the vast expansion in published literature both at home and abroad, it was recognized that this mass of report and open literature must be intelligently divided if comprehensive coverage and service responsibilities were to be served. Therefore, beginning in January 1963, the American Institute of Aeronautics and Astronautics has provided in *International Aerospace Abstracts* coverage in depth of the world's published literature, while our NASA programme concentrates in *Scientific and Technical Aerospace Reports* on similar coverage of the world's report literature. Both the NASA and the AIAA journals utilize the same indexing system. This is but one example of the active co-operation required for the necessary intermesh of aerospace research and development information. We at NASA recognize quite clearly the necessity for assuring that the output of our information programme becomes input to other allied information systems, and vice versa.

Fourthly, we believe that minimum centralization in our scientific information programme is fundamental. The necessity for rapid and flexible service, in keeping with our first principle of user orientation, rules out any great degree of centralization. Centralization, yes—but this is limited only to central processing where efficiency, economy, and speed significantly accrue. We feel that each participant in our national space and aeronautical programmes should have at his *immediate* disposal the information services, products, and tools he needs to use locally in support of his work. Having to direct a request to a major central information office in Washington should be the exception rather than the general rule.

Finally, the NASA programme recognizes that no type of service, no one reference tool, and no one bibliographic pattern can ever satisfy the many user publics to be served—the multiple needs of thousands of organizations and hundreds of thousands of individual scientists and technicians.

Our publication programme must obviously produce technical reports as primary records of NASA undertakings, but it must also produce many other second-stage publications which collate, compact, integrate or 'repackage' the mass of material contained in such basic records. Our bibliographic services must provide announcement journals and indexes and, in addition, a wide range of continuing and demand bibliographies, together with an extensive reference service, and a machine-search capability to satisfy specific requirements in the greatest depth possible. These are but a few of the many products and tools for the many publics.

Briefly then, these five principles—of service for the ultimate user, of timeliness, of co-operation and collaboration with other information systems, of minimum centralization and of information tools designed for a variety of users—determine the approach and objective of the NASA scientific information programme.

TOOLS, SERVICES AND PRODUCTS

In our day-to-day operations, three principle work areas are easily defined: the acquisition and bibliographic control of all information resulting from, or necessary to support, the tremendously varied efforts in aeronautics and the space sciences; the dissemination of this information within the NASA community itself and to many other national and international audiences; and, finally, a publications effort designed to provide both basic and supplementary interpretive publication of all information accruing directly from NASA's undertakings.

The basic material fed into NASA's information system is the technical report covering a specific piece of research work in any of the aeronautical and space science or technology fields. The current input is at the rate of 25,000 items per year and covers all available report material from NASA and non-NASA sources—domestic and foreign. We utilize a short informative abstract to communicate this scientific information. However, to provide for subsequent retrieval of the abstracts and information which they describe, all documents selected for the central collection are indexed in depth. A printed index is prepared to permit local searching and retrieval of the information by the individual scientist at the bench or the engineer on the line. At the same time, magnetic tapes are prepared for computer-based retrieval at our central facility or at field locations which have access to computer equipment. This indexing at two levels is provided to assure that both retrieval systems may be used at maximum efficiency. In the case of the printed index, documents are analysed to determine the four or five most significant subject index points—the sheer physical size of the printed index is a self-limiting factor pertaining to the depth of indexing. In the case of the computer tape, the fundamental manipulative ability of the computer permits an almost unlimited number of entries to fully characterize a document—in our operation, we are finding the number of entries for each document is usually in the range of 20–25. Our indexing language or vocabulary for both purposes is carefully controlled. Special attention is given to providing enough flexibility for the vocabulary to grow with scientific and technological advances, while at the same time placing the index terms in an ordered system so that all users—scientists, engineers, indexers, documentalists, librarians—may receive full benefit from the retrieval devices. Indexing is a vital artery of our system because so much of the overall effectiveness of an information programme depends on being able to retrieve all the materials pertinent to specific inquiries or needs.

Our basic announcement journal is the semi-monthly *Scientific and Technical Aerospace Reports (STAR)*. The publication cycle is such that all items received within any two-week period are announced in the journal within four to six weeks following receipt. Each issue of *STAR* has two major sections: the first is a listing of abstracts arranged for ease of scanning in thirty-four general subject categories; the second comprises four indexes—subject, corporate source, author, and report number. The detailed subject index provides multiple approaches to the subject content of each document through the use of specially prepared 'notations of content' incorporating three or four key words or phrases. This subject index is suitable both as a retrospective searching tool

and as a current scanning device to assist users in identifying newly announced items of significance to them.

Additionally, and to assure that our announcement journal remains a current desk tool, all four indexes are cumulated on a quarterly, semi-annual, and annual basis. These cumulations are issued within two to four weeks after the close of the period they cover.

In conjunction with our co-operative programme with the American Institute of Aeronautics and Astronautics, their abstract journal, *International Aerospace Abstracts*, is published on an alternating semi-monthly schedule with our own. *IAA* appears on the 1st and 15th of the month; *STAR* appears on the 8th and the 23rd of the month. I mentioned earlier that both journals utilize the same arrangement of abstracts, the same indexing system, the same indexing terms, and both observe the same periodicity with regard to cumulated indexes. In essence, these journals have standardized on treatment and complement each other.

One week before issue of its abstract journal, *STAR*, the NASA system provides for automatic distribution in microform copy of the full texts of the reports covered in *STAR*, both NASA and non-NASA, to the many participants in the aerospace programme—to NASA Centers, contractors and grantees, other government agencies and their contractors, depositories, etc. This automatic distribution may be either comprehensive or selective, depending on the stated needs of an individual recipient. Again, this automatic distribution is in keeping with the principle of minimum centralization. Its objective is to provide immediate access to reports of interest without the delay of requesting them from geographically distant points. After this initial automatic dissemination, specific requests for individual documents are answered—either in full-size or microform copy. Our microform copy is a 5 in. $\times$ 8 in. diazo transparency which represents a composite of all the best features of other existing microform programmes. The 5 in. $\times$ 8 in. transparency was selected because it embodies a high degree of compatibility with other programmes and because it provides a unitized record with extremely high readability and reproducibility.

Each microform, using a reduction ratio of 18 to 1, may record up to eighty-four standard page images. The microform can be viewed in most existing film readers, and can be reproduced on almost all available microfilm printers.

In our dissemination programme, microforms of reports appearing in forthcoming issues of our announcement journal (*STAR*) are transmitted to users on a daily basis, appropriately keyed to the journal issue in which the individual report will appear. This extension of information service assures that the individual user will have report copy available to him simultaneously with recognition of his interest in newly announced information.

In connection with the NASA microform programme, I should like to tell you of a very new co-operative development with the United States Atomic Energy Commission. Since many of you exchange informational materials with the AEC, you will be interested to learn that our two agencies have agreed to standardize on the use of microforms. Both agencies will utilize transparencies with an 18 to 1 reduction ratio.

Reference services are available from our central facility to meet the needs of

the scientist or engineer, and his company or laboratory. These operations are designed to satisfy both generalized and highly specific requests for information assistance. They are designed, if you will, to back up technical resources available to the user of aerospace information.

Utilizing computer techniques, our central facility prepares bibliographies in selected subject areas on a continuing basis and special bibliographies to serve information needs of individual requestors.

There are many other significant programme elements which contribute toward bringing vital information into the hands of our many user publics on a timely basis. The expanding translation programme, the organization of project-type information, the 'repackaging' of information all bear distinctly on the information challenges of the aerospace age.

Although we regard all three of these elements as being of major importance, I should like to elaborate on our 'repackaging of information' programme. In addition to the NASA Technical Reports and Technical Notes with which you may be familiar, we have embarked on a new programme of publishing conference and symposium proceedings, state-of-the-art monographs, technical reviews, handbooks, source books and data compilations, and dictionaries. Such projects are undertaken for the primary purpose of boiling down, or distilling, information into the most compact and useful packages. This type of packaging helps to round out what is an overall, fully integrated mission-oriented programme—the mission being in support of work in the aerospace science and technology area.

In sum, it means that custom-designed materials are being produced for ultimate consumers, bearing in mind that these consumers are such diverse users as scientists and engineers, or university instructors and students, or management executives, or the men in the factory or machine shop.

Our materials go out regularly and automatically to thousands of organizations in more than fifty countries. It may be of interest to you to know that a total of fifty-eight British Government organizations, colleges and universities, professional societies and industrial companies currently receive our output automatically and at no charge. Of this number, ten represent formal exchange agreements, and the majority of the remainder provide us with material on a somewhat irregular basis.

I can say that the most pressing problem confronting scientists and engineers is the availability of information—that is to say, the *local* availability of information. As we are all aware, the major centralized services and activities in the field of scientific and technical information do a creditable job of collecting, organizing and announcing information. Sole reliance on such points, however, interferes in many cases with the philosophy of ready availability of the items covered by such centres. It is our avowed purpose in NASA, therefore, to ensure that the information which we have collected, organized, prepared and announced is available to the user—actual and potential—in the place where he himself is located. As mentioned earlier, our objective is to provide immediate access to reports without the attendant delay of requesting from distant centres.

In conclusion, it is my sincere hope that if you have any thoughts of additional ways by which we may enhance our mutual working relationship, you will get in touch with me.

Letter to the Editor

ENGINEERING DOCUMENTATION

Dear Madam,

During the next few months I shall be making a comprehensive study of the present and future engineering documentation system needs of the US Army Missile Command. The Command maintains an engineering drawing library at its Huntsville, Alabama, Documentation Center, consisting of approximately 1,500,000 microfilm aperture cards in its current or working file and 4,500,000 cards in its historical or master file. These cards constitute a complete library of engineering drawings on all Army missile systems.

This is one of the largest such documentation centers, in a single location, in the world. The sheer size of this operation creates many problems of filing, retrieval, reproduction and distribution, as well as special problems such as 'out-of-file' conditions, which do not exist in smaller centers.

To keep abreast of these problems the Command has long been a leader, first in microfilming and subsequently in microfilm automation. However, as our documentation center continues to grow and its usage volume increases, we anticipate further problems. We are now planning for increased automation and mechanization during the immediate 2-7-year period, and concurrently are attempting to look still further ahead at the 8-15-year period when radical changes will have taken place in engineering drawing portrayal and display methods, when in fact drawings may not be on paper or microfilm at all but on TV tape or even as information within a computer.

My study will serve for the present and immediate future as a reference library on the state of the art of engineering documentation storage and retrieval mechanization and automation, and for the more distant future as a source of information and recommendations to guide the Missile Command (and possibly the Army as a whole) in long-term planning for the changes that will come in engineering documentation methods and portrayal systems. Portions of this study, in condensed form, will be submitted to the University of Alabama next summer as a Masters Thesis in Industrial Engineering.

In order that the study may be as complete as possible for the most effective use by the Army and the aerospace industry, I would appreciate any information from industry or from other military installations on the state of the art of engineering documentation automation, and on projected future developments in portrayal and display systems.

Please address communications to:

Lt-Col Kingsbury T. Jackson
General Delivery
University
Alabama

Yours truly,

KINGSBURY T. JACKSON,

Lt-Col, US Army Missile Command

13th April 1963

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O.J. WHITLEY

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

Aslib Proc. · vol.15 no.8 p.223-247 London, August 1963

the case of the suspicious librarian

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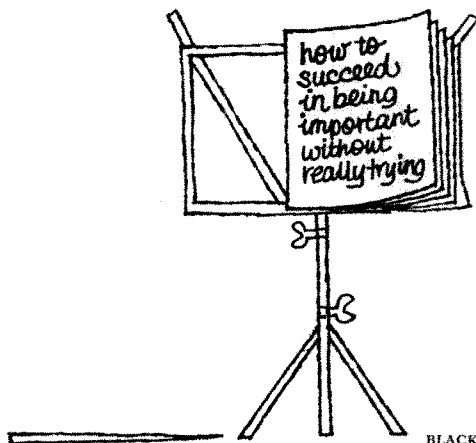
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ASLIB PROCEEDINGS

incorporating Aslib Information



Volume 15

August 1963

Number 8

ASLIB CALENDAR 1963

September

THUR.12. Technical Translation Group meeting at Aslib, 3.30 for 4 p.m. 'Alphabets of difficult languages', by R. Sewell.

TUE.24 - THUR.26. 37th Annual Conference at St Andrews.

October

TUE.15. Chemical Group sherry party at Aslib.

WED.16. Evening course on handling Russian literature begins.
See paragraph below.

THUR.17. Technical Translation Group meeting at Aslib.

TUE.22. Evening meeting at Aslib, 5 for 5.30 p.m.

November

THUR.7. Technical Translation Group sherry party at Aslib.

THUR.21. Evening meeting at Aslib, 5 for 5.30 p.m.

December

WED.18. Aslib Christmas sherry party.

Evening Course on Handling Russian Literature

The course on handling Soviet and East European literature will be held at Aslib again after an interval of two years. The course enables students to become familiar with the Russian alphabet, to transliterate, to recognize the more common Russian bibliographic terms and scientific words, and to identify other East European languages. The course also covers the organization of publishing and bibliography in the Soviet Union, and sources of supply of Russian material in Great Britain. The lecturer will be Miss Judith Kerr, B.A., who for the last year has been in charge of the Commonwealth Index of Translations and the Register of Specialist Translators in the Aslib Information Department, and who gave a lecture at short notice in the course on 'Using foreign languages' last year. The lectures will be held from 6.30 to 8 p.m. on Wednesday evenings from 16th October to 4th December. The fee for the course will be seven guineas. A full programme is enclosed in this issue, and applications should be made on the form contained in it.

Furniture Group

The Furniture Group was very fortunate in being able to hold its Annual General Meeting at the High Wycombe Museum on 13th April 1963. The ten members present had the opportunity, due to the excellent preparations made by the Borough Librarian and Curator, Mr L. J. Mayes, F.L.A., of being shown round the Museum. A full agenda was finally completed and plans were made for the proposed Furniture Information Service, the Group's book list, and further activities. The officers and committee were re-elected for a further year; Mr W. H. C. Moreton and Mr G. L. Harding, both of Shoreditch Public Libraries, will continue to serve as Chairman and Hon. Secretary respectively. After the meeting was concluded members made their way to Messrs Parker-Knoll to see their interesting and unique collection of furniture collected over the years by the owners of the firm.

Language Teaching for Science and Technology

The Department of Liberal Studies of the Royal College of Advanced Technology, Salford, is initiating training courses in modern languages with particular emphasis on translating and interpreting for scientific and technological purposes. These will be three-year courses, aimed to provide the highest qualifications in two languages and translating ability in a third language; and to give students a grounding in the basic concepts and vocabulary of science and technology, with specialization in a selected field. It is intended that students shall have periods of residence and study in the countries of their major languages. Full information and copies of the prospectus for 1963-4 may be obtained from the Principal, Royal College of Advanced Technology, Salford 5, Lancashire.

Research on Information Retrieval

Mr J. Farradane has been appointed Senior Research Fellow at Northampton College of Advanced Technology, London, to direct research on information

storage and retrieval, under a DSIR grant. He will also be Course Organizer and Senior Lecturer for the full-time and evening courses in information science to be given next autumn (starting 30th September), as announced in the April issue of *Aslib Proceedings*. The research will, in the first place, concern the development of 'relational indexing' and of concept-grouping procedures supporting this method, and the devising of statistically valid procedures of tests of retrieval and the determination of the characteristics of the variables involved.

Commercial Information for Management

This was the theme of a seminar (announced in *Aslib Proceedings* for April 1963) which took place at the British Institute of Management on 23rd May. It was arranged as a direct follow-up of the BIM survey on the *Collection and communication of commercial information within companies*. The seminar was led by Mr E.H.E. Jones, Head of the Central Information Services at Shell International Petroleum Company Limited, and twenty-eight people were present.

Discussion was under three headings: (1) the range of commercial information; (2) organizing the collection and useful placing of information within the firm; (3) staffing and evaluation. Under (1), a major problem considered was how to discover what information was of specific interest to management; among suggested solutions were that information officers sit in at management meetings, and see confidential reports and internal correspondence. The value of special sources such as trade journals and news agencies was commented on, and the importance of speed was urged since commercial information is wanted immediately for decision-making. Many delegates considered that companies were unnecessarily secretive about commercial information and agreed that trade associations might encourage firms to exchange information.

Under the second heading the merits of centralization and the degree of co-ordination between decentralized units were debated. The difficulty of segregating commercial from technical information was mentioned. News bulletins were generally found to be useful but it was emphasized that these should be carefully selective if management was to get the best value out of them.

This part of the discussion ended with brief reviews of classification schemes—the usefulness of the Standard Industrial Classification was stressed—and of language problems. Most delegates' companies used their own translators or outside translation services such as the Aslib ones, and some employed both.

Mr Jones opened the discussion on staffing. He said that what must be sought above all was quality and that this called for careful selection. In conclusion it was agreed that developments in the field of commercial information were still, in many instances, at the pioneering stage when compared with the sophistication of technical information.

The survey and the seminar discussions had clearly proved that there was a great deal to learn from what other people were doing in this rapidly developing sphere of information work.

Repeat of BIM Seminar

In response to demand, the seminar on commercial information for management described in the paragraphs above has already been repeated, and there will be a second repeat on Tuesday 1st October. It will be held from 2 p.m. to 5 p.m. at Management House, 80 Fetter Lane, London EC4. The fee will be four guineas for BIM members and representatives of member companies, and five guineas for non-members. Further details may be obtained from the Conference Secretary, British Institute of Management, at the address given above.

Standards of Scientific Literature

The latest in the Unesco series *Documentation and terminology of science* has just been published. *Bibliography of publications designed to raise the standard of scientific literature* is an annotated list of works likely to help authors of scientific papers and other texts, particularly those authors of works on the methods and practices employed in preparing scientific manuscripts, composing texts in specific languages, drafting and editing scientific and technical texts, collecting materials and references, compiling indexes, etc. French, Russian, Spanish, German, Bulgarian, Danish, Polish, and Czech, as well as English-language publications are covered. The bibliography is available from Unesco, Place de Fontenoy, Paris 7e, or HMSO, P.O. Box 569, London SE1, price 6s.

Library Buildings

Library buildings of Britain and Europe by Anthony Thompson is a welcome addition to the existing literature on this subject: a comprehensive work on library design has been greatly needed by librarians and their co-operators, the architects. This systematic and well illustrated study provides basic data for the architect, background reading and sources to aid librarians and library committees engaged in preparing a building programme, and forms a unique work of reference for the library student. National, public, school, college and university, and storage libraries are covered, but special libraries are omitted. The book is published by Butterworths, price 5 guineas.

Index to Periodicals on Anthropology

The Library of the Royal Anthropological Institute receives more than 470 current periodicals dealing with all aspects of anthropology and covering work done in most countries of the world. The Institute has just published the first of a quarterly *Index to Current Periodicals*. Each part will contain about 1,250 entries arranged in six sections: General, Africa, America, Asia, Europe, East Indies, Oceania, and Australia. These are subdivided into Physical Anthropology, Archaeology, Cultural Anthropology, Ethnography, and Linguistics. Volume 1, part 1 contains a check-list of the Institute's holdings of all the periodicals indexed. This publication is available on subscription only from the Publications Department, Royal Anthropological Institute, 21 Bedford Square, London WC1, price 40s per annum.

Catalogue of Periodicals in the German Language

A new edition has been published by W.E. Saarbach GmbH of their *Subscription catalogue* 1963 which contains 3,213 entries of periodicals, newspapers and annuals published in the Federal Republic, East Germany, Austria, and Switzerland. The subjects covered are science and technology, medicine and business. An alphabetical listing of titles stating periodicity, subscription rates, and postage is supplemented by a classified section. Indication is given of summaries or reviews in languages other than German. The catalogue may be obtained free of charge from W.E. Saarbach GmbH, P.O. Box 1510, Cologne 1, Germany.

Methods of Literature Searching

An introductory practical guide to methods of literature searching has been published, *Bibliographische Suchpraxis: eine Einführung*, by R. Weitzel. Stuttgart, Poeschel Verlag, 1962. 140 p. (Werkstatt des Buches). It is intended to help the young recruit to bookselling in his day-to-day work, and assumes that some familiarity with book trade bibliographies and reference work has been, or is being, obtained. Only title searches are dealt with and rather more than half the work is devoted to examples. The reader is told how to make the most of the often inadequate information given by inquirers, and how to classify and adjust his search procedure accordingly. This German text is available from C.E. Poeschel Verlag, Kernerstrasse 43, Stuttgart-O, Germany, price DM 11.

Automation and Scientific Communication

This will be the theme of the American Documentation Institute's twenty-sixth annual meeting in Chicago, from 6th-11th October. The meeting will encourage critical review and discussion of established and experimental procedures involving automation, and will deal with problems of communication in science, law and management. Details of the papers and programme may be obtained from the American Documentation Institute, 1728 N Street, NW, Washington 36, DC.

Standard List of Subject Headings in Industrial Relations

Since 1952 when the first edition of the *Standard list of subject headings in industrial relations* appeared, it has become a widely used and highly respected reference list among librarians, research workers, and practitioners in the industrial relations field. A new edition has been prepared by the Subcommittee on Subject Headings of the Committee of University Industrial Relations Librarians, and pursues the original purpose of providing libraries having special interests in this subject field with a standardized list of terms extensively cross-referenced and annotated. It is available from the Industrial Relations Section, Princeton University, Princeton NJ, USA, price \$4.25.

Research Administration Course

The Comparative Administration Trust is holding a course on administration and management of research and development, at Queen's College, Oxford,

from 1st to 28th September. This is one of a series of four-week residential courses whose aim is to improve efficiency in the administration of technical work in industry and research establishments. Preference will be given to applicants with science or engineering degrees. Further information and application forms may be obtained from Comparative Administration Trust (quoting ref. QCO/42), 30 St George Street, Hanover Square, London W1, telephone Victoria 5334.

Part-time Classes in Librarianship

The North-Western Polytechnic has issued a leaflet describing its part-time courses in librarianship during the coming year, including classes for the present Library Association syllabus and a conversion course to the new syllabus; in certain cases there will also be special arrangements for taking the whole of the new syllabus part-time. Intending students should apply without delay to the School of Librarianship, North-Western Polytechnic, Prince of Wales Road, London NW5.

INTER-LIBRARY CO-OPERATION AND STANDARDS OF PUBLIC LIBRARY SERVICE

THE FOLLOWING is the text of a statement sent on behalf of Aslib to the Ministry of Education in connection with its two Working Party Reports on the Public Library Service. It will be recalled that the Minister of Education set up, in September 1957, a committee, under the Chairmanship of Sir Sydney Roberts, 'to consider the structure of the public library service in England and Wales, and to advise what changes, if any, should be made in the administrative arrangements, regard being had to the relation of public libraries to other libraries.' The report of this committee was published in February 1959. In December 1960 it was announced that the Government intended to give the Minister of Education a general responsibility for oversight of the public library service; and that public library authorities would be required to discharge a statutory duty to provide an efficient service. Further study of certain problems was, however, felt to be needed before legislation could be drafted, and two Working Parties were appointed for the purpose: one, under the Chairmanship of Mr H. T. Bourdillon, to study the basic requirements for an efficient public library service, the other, under the Chairmanship of Mr E. B. H. Baker, to examine the technical implications of the references made to library co-operation in the Roberts Report. The reports of the two Working Parties were published in December 1962, and it is to points in these two reports that the Aslib statement refers. For brevity, the three reports are referred to as Roberts, Bourdillon and Baker respectively:

Statement

1. Standards of library service

In the Roberts Committee Report on the *Structure of the public library service in England and Wales*,¹ and in the two Working Party reports *Standards of public library service in England and Wales*² and *Inter-library co-operation in England and Wales*³ there is an assumption that the purpose of the whole library system is to satisfy readers. Yet little attempt seems to have been made to find out how far readers are in fact satisfied at present. We note, and welcome, the intention to review standards of service from time to time, but would emphasize the need to make the reviews in the light of the users' needs. Standards based on conjecture or subjective opinion, however well informed, have very limited validity and research techniques are now sufficiently well developed to make such inspired guesses obsolete. To establish what the users' needs are it will be necessary,

during the next year or so, to carry out some consumer research not only among the general public but also among special libraries, which are both consumers and co-operators. The collection of such evidence ought to be regarded as an essential part of any attempt to maintain adequate standards.

The foregoing comments are particularly relevant to the following recommendations in the Bourdillon report (p. 45):

- '(4) The formulation of standards of library service in clear terms over as wide a field as possible is essential both as a basis for judging the efficiency of any particular authority and as an incentive to all library authorities, large and small'.
- '(5) The periodical review of standards should be one of the main functions of the proposed advisory council'.
- '(7) The basic library unit which we have postulated is the smallest unit capable of providing an adequate library service for the population which it serves . . . '.

The fact that the use of well-equipped libraries may be significantly greater than had been guessed in their planning stage can be seen from this extract from *The Times* of 22nd February 1963:

'Norwich Feb. 21. A library today called for staff reinforcements to cope with an expansion in reading among Norwich inhabitants. Since a new ultra-modern £358,000 library in the city centre was opened by Queen Elizabeth the Queen Mother last month there have been queues of borrowers every Saturday outside it—something unknown before, said Mr Philip Hepworth, City Librarian. The number of books borrowed has shot up from nearly 35,000 in January, 1962, to over 42,500 in January, 1963, and during the first two weeks of February from 20,400 last year to over 28,000 this year, an increase of over 30 per cent'.

If the standards already suggested should prove to be too low because of inadequate consumer research, not only will the public libraries themselves fail to provide the service required of them, but more calls than are justified will be made upon the stocks of the special libraries, which exist to serve private clienteles and are mostly financed by them.

2. Regional organization

We very much doubt the wisdom of spending as much effort and money on regional co-operation as is suggested in many of the recommendations in the Baker report (p. 21-23). We do not quarrel with the idea of regional schemes for co-operative book storage, coverage of periodicals, and similar attempts at rationalization. But the regional organization of union catalogues is, in our opinion, extremely costly and only marginally effective. Such evidence as exists seems to indicate that most serious users prefer local co-operative schemes, e.g. within a radius where personal visits are practicable, backed by efficient centralized national co-operation. We believe that such a scheme is likely to be the more efficient and, in the long run, the more economical. Our reasons are:

- i. It would avoid expensive duplication of catalogues.

- ii. Since no region can be wholly self-sufficient, some demands will always have to be sent on to a central point, and a direct link between the consumer and his local library service on the one hand and a central administrative office on the other is more efficient than an indirect approach.

Note. At this point we should like to comment on part of paragraph 74, p. 23 of the Bourdillon report: 'There is some evidence of a need for a central clearing house (possibly linked with the British Museum or the National Central Library) to receive inquiries and to pass them on to the appropriate libraries or institutions'. It should be borne in mind that it is more efficient for the inquirer for information (as opposed to books) to be put directly in touch with the appropriate source, than for a central agency to act as a go-between; questions received at secondhand can rarely be so easily, or so effectively, answered as by direct contact.

- iii. If, as is suggested in Recommendation (20), p. 22, a computer were to be used for union catalogues (and there is a strong case for this), the case for centralization is strengthened.

If there are particular considerations which make it desirable to treat Scotland and Wales as separate regions, we still think it unwise and unnecessary to carve up England into four or five regions (Recommendation (3)). If, nevertheless, the proposals for regional organization are implemented, it is most important that direct contact between non-public co-operating libraries and the National Central Library should be permitted to continue.

We also consider that special libraries which, even though they may not contribute financially (except on a voluntary basis), contribute heavily in materials and service, should be represented on any regional governing bodies that may be thought necessary.

3. Special libraries (i.e. those of industrial firms, learned societies, etc.) and the public library system

Special libraries are maintained at the expense of the special groups who need them because they find the public library service inadequate for their special needs. Nevertheless, they pay, through the rates, their proper share of the cost of the public service. We therefore disagree, most strongly, that subscriptions should be demanded of them (as suggested in Recommendation (8), p. 21) except on a voluntary basis or, exceptionally, for services rendered. Furthermore, the national library system should be publicly provided and should not, except in very special circumstances, need to make demands on privately owned collections gathered for specific purposes and for specific groups of people.

It cannot be too strongly emphasized that many societies with valuable collections are finding that their maintenance already imposes a serious strain on their resources, and the strain becomes continuously more severe as costs continue to rise. In such circumstances, it is clearly unrealistic to expect them to give extensive service to other, publicly financed, libraries—and some of them are subject to heavy demands—or to pay for so doing.

4. The National Central Library

i. Finance

In the main we support the reservations of Mr F. G. B. Hutchings (on p. 24 of the Baker report), particularly his statements:

- '1. I wish to dissent from paragraphs 39-45 which recommend that a substantial part of the cost of the National Central Library should be met by local authorities. In my opinion the whole cost should be met by the Exchequer . . .'

and

- '4. The analogy which comes closer to the point is with the National Lending Library for Science and Technology, which is entirely supported by government funds. The need of the humanities is met at a much smaller cost by combining existing library resources through the regions and the National Central Library. Why should the Exchequer meet all the cost on the one hand and, on the other, seek a subsidy to turn local enterprise into a national asset?'

We do not, however, agree with Mr Hutchings's implication that the National Central Library is only concerned with the humanities at present. It may well be that, in the future, the National Lending Library for Science and Technology will be the basic source for literature in the sciences and technology, and that another national lending library will then be responsible for the humanities and social sciences. In such circumstances the requesting libraries would, of course, make direct demands on one or other of the national lending libraries and the National Central Library would no doubt be the co-ordinating body, with a complete union catalogue, to which either of the two national lending libraries would apply when unable to satisfy demands made upon it.

ii. Governing body

Even if it is decided that the main support for the National Central Library is to come from local government resources, we do not think it follows that the governing body should consist largely of local government appointees. Recommendation 28, p. 23 is in no sense an improvement on the present arrangements. What is important is that the governing body should consist of persons chosen for their suitability for running a national library service.

iii. Co-operative acquisitions

In paragraph 49, p. 19 of the Baker report and in Recommendation 29 it is suggested that the National Central Library's resources for the purchase and storage of books should be considerably increased. It is, in our opinion, even more important that ample resources should be made available to all co-operating libraries.

5. Union catalogues

Mention is made (paragraph 31 and Recommendation 15 of Baker) of the need to include special library holdings in union catalogues; it is assumed that this reference applies equally to specialized library holdings in London and the South East region.

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3. GREAT BRITAIN. Ministry of Education. Inter-library co-operation in England and Wales: report of the Working Party appointed by the Minister of Education in March 1961. London, HMSO, 1962. Chairman, E. B. H. Baker.

INTERVIEWING

O. J. WHITLEY

Controller, Staff Training and Appointments, British Broadcasting Corporation

Evening meeting, London, 24th April 1963

Chairman, LESLIE WILSON, Director, Aslib

WHAT is an interview? Some would say it is something that occurs very rarely in their experience and is usually connected with education or employment. Others, more reflective or perceptive, might say that for most people hardly a day passes without several interviews: interviews at the ticket booking office, at the cleaners maybe, certainly at work, and this winter very probably with the doctor or the plumber, gas fitter, electrician, coal merchant, insurance inspector. Some would say that an interview takes place every morning at the front door when the post is handed over, as a result of which one householder and one uniformed public servant feel either better or worse than they did before the bell rang.

For our purpose today we should take a middle course and think of the interview as something rather more formal and organized than a mere conversation, but also as a piece of communication which is a frequent and indispensable part of business, commercial and professional life.

I believe that my audience is mainly concerned with interviewing of two kinds, recruitment interviewing and reference interviewing. I shall concentrate on the first of these because it is the one in which I am most experienced. I should also add that some of the things that are true of recruitment interviewing are also true of reference interviewing and I shall point to one or two of these; you will perhaps see others. Finally, I shall say a word about the bibliography of this subject.

First, then, career interviewing. I shall begin by talking about it as I know it in the BBC. This is a large and variegated organization. Over a hundred separately identifiable professions and trades ply their specialized skills among its 18,000 members, as ever greater refinements of choice, definition and colour for the public steadily increase the ratio of backstage people to those in touch with microphone or camera. Its peculiar character would not be well suited to the systems of recruitment and promotion used by the Civil Service or most large commercial organizations. It uses, and values, a system of natural selection rather than direction, Darwin rather than Lamarck, in accordance with which most of its vacancies are advertised—always internally and sometimes in the Press. The choice is made from a short-list of candidates interviewed by a small selection board under a chairman who has, so to speak, no axe to grind in relation either to the vacancy or to the candidates. No system of recruitment and promotion is perfect. This one has its drawbacks. But it does reduce, indeed it practically eliminates, opportunities for personal favouritism.

The keystone of the system is the interview, not only the interview before the appointment board, but preliminary fact-finding interviews of each short-listed outside candidate by a member of the Appointments Department, and also interviews which are part of a fairly elaborate system of annual reports on BBC staff. People sometimes ask whether it can be right to allow so much to depend upon a mere half-hour interview. Surely, they say, where BBC staff are concerned, the decision should depend upon their record of service? And so to a very great extent, of course, it does. But the interview can sharpen up the record of service and bring it into focus, into conspectus. It enables several people who have to reach a collective decision to see the same human proposition in the same way at the same time. People also ask, where outside candidates are concerned, why we in the BBC do not use IQ tests, psychological tests, leaderless group tests and so on. A fair comment, and we have considered these things many times, but have always come to the same conclusion. The short, sharp tests, expressed rather crudely for the sake of brevity, are extremely fallible. The long ones—the leaderless group discussions, the dinners and the week-ends—constitute a fearful temptation to the selectors to believe that truth is being revealed in proportion to time and effort given. Better on the whole to trust in the interview, carefully conducted and based on all the relevant information that can be obtained, but not to trust it further than it deserves: then for the real conclusive test—a long probationary period of doing the job.

What is a carefully conducted appointment interview? This is an interview for which adequate preparation has been made, and preparation is not adequate unless the interviewing board knows precisely the nature of the work which the successful candidate will be called on to do, and has a clear idea of the kind of experience and qualities for which it is looking. If there is an advertisement, it must of course describe the job or be followed by a description of the job to applicants; it may also specify experience. It is a waste of time to specify qualities, especially moral qualities. Everyone who understands what they are thinks he possesses them. Integrity is much in demand. But who would ever admit that he has not got it? This is not to say that when it comes to the interview there should be less emphasis on qualities than on experience. The interviewer may get a better result, for example, if he looks for an inquiring mind than if he looks for someone who is good at research. Nor is preparation adequate unless the necessary facts of applicants' lives and careers have been stated beforehand and reproduced so that interviewers have them before the interviews begin.

A carefully conducted interview has regard to the rights and privileges of the interviewee. It is grossly unfair to keep him waiting if you can possibly avoid it. He is entitled to know who are the people who face him at the interview. He should not be made to make an awkward entry or sit in a strong light. It is bad manners, and extremely discourteous to the candidate, for interviewers or members of a board to distract him or risk distracting him by, for example, whispering to each other, obviously passing notes to each other, reading matter which the applicant cannot see or understand (whether they do this blatantly or surreptitiously), by allowing telephone calls to interrupt, by going to sleep or, worst of all, by appearing to be bored. Seeming bored is the worst, and perhaps

most common, sin of all. We all know that managers and parents who are, or seem, indifferent, do staff and children more harm even than managers and parents who are aggressive. So it is with interviewers. But, you will interject, should not the candidate be put under stress in the interview so that it can be seen how he reacts to pressure which he will certainly encounter if he gets the job? The answer is 'no', for a good deal of stress is built-in to the interview already and inevitably. If it is artificially accentuated, some candidates break down, some become aggressive in self-defence, some languid and offhand from sheer cussedness. And all you learn is that if you did it again they might or might not react in the same way. There is supposed to have been an admiral who kept up a rhythmic banging of a table throughout an interview to test the candidate's nerves. *Not* a good idea!

A carefully conducted interview is one where it is never forgotten that past behaviour is the best guide we have to future performance. The child *is* father of the man. A man's life is a continuum, not a kaleidoscope. It is far more important to concern yourself with whether a man who was steward of his junior common room at a university was elected by his peers or appointed by the establishment, than with the superficial popular fallacies such as that a look straight in the eyes betokens honesty or red hair a hot temper, that crooked socks indicate untidy filing, or a firm handshake is a sign of determination. (Shaking hands with the two most determined men I have known was like receiving a tentative offer of a dead fish.) The true relationship between physique and personality is a great deal more complex than that. I am not decrying Sheldon's division of people into endomorphic, mesomorphic, and ectomorphic. Shakespeare seems to have been on to the same idea when he made Caesar say:

'Let me have men about me that are fat;
Sleek-headed men, and such as sleep o' nights;
Yond Cassius has a lean and hungry look;
He thinks too much: such men are dangerous'.

Obviously every single bit of us, every aspect and attitude, from our craniums to our handwriting, means something. I am simply saying that nothing is so important as what a person has done and when and how and why.

A well conducted interview has a duration based on the number of people who want to have any useful communication with the interviewee. It cannot be less than five minutes multiplied by the number of such people on the interviewing board. If you have six members of the committee or board and none is content to stay silent and to undertake to do so beforehand, you must allow not less than thirty minutes for each candidate.

Just a few more quick 'do's' and 'don'ts'. Interviewers should *not* talk very much. The interviewee is the one who should be made to do most of the talking. Long questions which the interviewee can answer with a 'yes' or 'no' are the opposite of good. A great many fatuous questions are asked at such interviews. 'Do you think you'll be happy in a large organization?' they ask a man who has never worked in one. How can he know? And how can he be expected to say anything but 'yes' or 'I don't know', neither of which is of any significance? It might be much more rewarding to ask him what he *imagines*

would be the advantages and disadvantages for the individual in working in a large organization. Some interesting tests were recently made in interviews by Youth Employment Officers. They showed that the amount of information gained from the young people was roughly in inverse proportion to the amount of talking done by the Youth Employment Officers.

Do give a candidate a final opportunity, before the end of the interview, to get anything off his chest which he may not have had a chance to do before. Do be prepared to tell candidates when they can expect to hear the result of the interview.

I have intentionally said nothing so far about one further requirement of a different kind, namely the extent to which the interviewer, despite disciplining himself to talk little, must be prepared to put something of himself into the interview, to invest himself in order to draw a dividend. I shall come to this under the heading of reference interviewing because it is common to both, indeed to all, kinds of interviewing.

Reference interviewing, about which you know so much and I so little, is more unlike career interviewing than like it. The relationship of the parties to each other is quite different. Object and method are different. The career interview fails absolutely only if it does not reveal character and capacity. The reference interview fails absolutely only if the real quest of the inquirer is not identified by the librarian. (There was absolute failure when a certain librarian failed to realize that a request for 'a biology of the stars' was not a request for a book on astronomy or astrology but for information about the parents of Douglas Fairbanks!)

In an effort to learn a little about your work, I read some of Margaret Hutchins's book, *Introduction to reference work*. In it I found these sentences. 'The first requirement made of the reference librarian is approachability, not only easy access physically, but easy intellectual and spiritual access as well. This is to be accomplished not by the librarian's composing his face in a fixed Mona Lisa smile, but by letting it show his inner feeling of interest and welcome.' Here, surely, we *are* on the edge of common ground between the two otherwise disparate kinds of interview. The librarian and the appointment interviewer both, if they know their work, know that in their kind of interview or any other under the sun, there should at best be a certain mutuality.

If I could be sure that everyone here had read any of the books of Martin Buber, I should need to say no more. A certain mutuality. Martin Buber has pointed out that one person can be careful and solicitous about another, can incline toward him in action and help, can be interested, welcoming, even compassionate, and yet remain within himself with the essential barriers of his being unbreached. He makes his assistance, not his self, available to the other. Nor does he expect any real mutuality; indeed he may positively shun it. He is concerned with the other, but not anxious for the other to be concerned with him.

In a full relationship, on the other hand, these barriers are breached. Two people are concerned with each other and the situation is transformed. A new phenomenon appears which can appear in no other way. When this appears in an interview situation the people involved stop sparring. Pretences are dropped

and the nub of the matter emerges, whether it is the real nature of a job or a candidate or the real nature of an inquiry. To be able to engender this kind of mutuality, even in such a fleeting personal relationship as there is opportunity for in a short interview, comes to a man in the course of his life only, I suppose, as a kind of grace. Not for me now to say where grace comes from. But at least I can say that the outward and visible sign of it is a willingness to give something of oneself without being asked for it, to confide maybe in the third minute something that true bred Englishmen do not ordinarily confide to a close friend after three years, to go out on a limb and risk even appearing in that supremely ridiculous position of having put coins into a slot machine without receiving anything in return. But mostly, in my experience, the return is generous and rewarding.

One day in March my lunch was reduced to whatever I could buy in the Forte's in Regent Street to take in to the office. I was late, I waited for several precious minutes before anyone came to serve me. There was only cheese and tomato in white bread. I wanted brown. Not a promising start. There then appeared a middle-aged woman and, before she had time to serve me, a humorous little man looking like Rumpelstiltskin from behind the scenes. He put a package in her hand, told her he was leaving Forte's to go to Australia on the following day and it had been a pleasure to have worked with her. He disappeared into the kitchen and more present-giving. She forgot for the moment about my cheese and tomato sandwich and brought the parcel to show me. It contained two very nice pieces of china—quite old. She was delighted—as well she might be. 'We shall miss his laugh', she said: 'such a delightful person.' 'Yes,' I said, 'I can see that'. Then she remembered my sandwich, put it in a bag, took my two shillings, gave me fivepence change and thanked me as if I had bought a Rolls-Royce or given her a £5 tip. And I went on my way rejoicing as the Bible says: so much so that I must have had hold of the wrong end of the bag, for this much publicized cheese and tomato sandwich was soon sitting up in the middle of the road.

Now what had happened? Why shall I remember this rather trivial little episode for years after I have forgotten many other visits to shops and restaurants? Because I had had a glimpse of graciousness by some kind of trainee manager in Forte's which had touched the woman who served me, because she knew that I had seen this and because she then briefly shared her feelings about him with me. For a minute or two the sandwich was forgotten. The thing that mattered—avoiding the language of psychology or religion—was that two, possibly three, people had revealed something of their real selves, had allowed part of themselves to be looked in upon, had shown something that they cared about, had thus ceased for a moment to be puppets moving to the conventional drill of a business relationship.

You may think this far-fetched. You may even begin to feel a little uncomfortable, like British people when they see French generals or Russian statesmen greeting others of their kind. It is quite difficult nowadays to talk simply and truly of personal relationships without being considered peculiar in some way. Some people are simply unaware of what I am talking about. They don't have this kind of relationship with any person. Because they won't give anything,

they receive nothing. But believe me this is something real and valuable. This—grace—is something that everyone who interviews, whether recruiter or promoter, or consultant, or adviser, or schoolmaster, or parent, or librarian, should have. Can it be cultivated? Perhaps not. But it can at least be allowed to grow.

Now a word about books on interviewing. There is a formidable list of these and I have only read some of them, but here are some recommendations. If I were studying the subject all over again I would read very thoroughly Anstey and Mercer's *Interviewing for the selection of staff* and J. S. Gough's *Interviewing in twenty-six steps*. These are very sensible, sound, systematic and comparatively simple books. They are not long either. Then I would stop reading books and get all the practical experience I could for weeks, maybe months. Then, when I felt that I was no longer a novice, I would start dipping into the 'night life' of the subject, for example *Interview case studies* by J. M. Fraser, *Interviewing for selection* published by the National Institute of Industrial Psychology, and the *Psychology of the interview* by R. C. Oldfield.

If you ask me whether this indicates a cautious attitude to psychology, I have to say it does. I think that psychologists and psychology have something of value to contribute on interviewing as in many other spheres. But I have found psychologists to be peculiarly lacking in self-criticism and insensitive to the limitations of their methods. Humility is a good characteristic for interviewers and those who write on interviewing. A certain sophistication is necessary before one travels in this company without being led astray.

I do not intend to venture into your own bibliographical field. Suffice it to say that I found *Introduction to reference work* by Margaret Hutchins interesting and apparently wise.

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Mr R. L. Collison, Librarian of the British Broadcasting Corporation.

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DISCUSSION

Mr C. J. O. Moorhouse (Shell International Petroleum Company Ltd) asked if the speaker thought that, when interviewing candidates who were already on the staff of the organization, it was a good idea to interview several candidates at the same time and get them to take part in a discussion?

Mr Whitley said he did not think this to be a good idea. Some characteristics might be revealed in an observed discussion which would not emerge in a tête-à-tête interview; but in his experience the best value for time was gained from the simplest possible interview situation, free from gimmicks and avoidable stress.

Mr G. Woledge (British Library of Political and Economic Science) asked the speaker if he could say more about the procedure of holding a one-man interview as a preliminary to an interview by a board?

He also asked if Mr Whitley would agree that, although in general interviewers should say as little as possible, there were occasions when it was useful for an interviewer to draw out an oysterish candidate by speaking at length and even perhaps rather egotistically? This might be justified by the latter part of Mr Whitley's address, though condemned in the former.

Mr Whitley said that for finding out about a candidate a single skilled interviewer had no rivals. The presence of several people on selection boards did not ensure more productive interviewing, but was necessary for a collective decision. The preliminary interview was a useful prologue to the board interview. It could be made part of the weeding-out process before the short-list, or could be justified through the benefit to the final selection board in having a report from the preliminary interviewer which arose from an interview in greater depth than was often possible in the more formal and fragmented circumstances of the board.

Replying to Mr Woledge's second question, Mr Whitley agreed that it was essential to get the candidate to talk by one means or another. Some candidates needed the investment of more of the interviewer's capital than others before paying a dividend. The interviewer must have capital to invest and be ready to risk it.

Mr J. A. Edwards (Beecham Toilet Division Ltd) said he would like to know the speaker's views on the professional management selection organizations which were growing up in this country.

Mr Whitley said he had no experience of management selection organizations. He imagined that they must provide a very useful service to small organizations, but that large ones ought to be able to 'do it themselves' better than any other agency.

The Chairman said that Mr Whitley had spoken almost exclusively in terms of formal interviews across the table. Did he think that, in periodic staff interviews and possibly even in recruitment, there was a case for what might be called the workshop interview, conducted on the floor of the department itself, and permitting examination of the objectives and methods of the department to serve as basic material for the interview?

Mr Whitley said that the occasional informal shop-floor interview by the boss was a necessary part of staff management by any boss who wanted to avoid the substance or the image of remoteness. But he did not think that when a selection interview took place in the work surroundings the benefits of realism of scenery and allusion balanced the disadvantages of distraction.

Mr L. J. H. Haylor (Ministry of Aviation) suggested that the Civil Service interviewing board procedure did not differ as much from that of the BBC as Mr Whitley had indicated; the make-up and procedure of boards, particularly the departmental ones as opposed to those of the Civil Service Commission, were generally the same; and in the case of internal candidates members were provided with information based on annual reports. One of the first things one was taught when sitting on boards was to reduce as far as one could the interviewee's nervousness; in this connection he would like Mr Whitley's views of a case he had recently heard of when a young man attending an interview, presumably with one of the modern allegedly high-pressure consultants, found that the first action was the switching on of a tape recorder; the interview was then conducted by one man whilst another older man sat in the room but was not introduced to the candidate, nor did he say a word. The tape recorder seemed to him to have been a gross impudence (the interviewee had not attended for a record of his voice) and was also likely to have increased the candidate's nervousness.

Mr Whitley agreed that tape recorders and unexplained presences contravened the interviewee's right to find an understandable and, as far as possible, acceptable set-up.

Mr R. Coleman (Shell International Petroleum Company Ltd) asked if there was not a difference between staff and information interviewing in that, after an atmosphere of 'mutuality' had at first been created, an 'information interview' must be continued on a purely objective level. Otherwise the participants might be distracted from the main purpose of the interview.

Mr Whitley agreed that the interview, of whichever category, must not degenerate into an exchange of confidences mixed up with a professional dialogue. It must be more a matter of judgement than prescription.

Mr A. H. Holloway (Admiralty Centre for Scientific Information and Liaison) said he had been rather surprised at the idea of asking a candidate for formal information at a preliminary, one-man interview, since he had found this to be a useful means of breaking the ice for a candidate and of indicating to a board what sort of candidate they had before them. He asked for an opinion as to whether, if it was apparent early in an interview that the candidate was or was not suitable for the job, the interview should be continued, largely to assure the candidate that he was getting fair treatment.

Mr Whitley thought that basic information ought to be established before the board interview whenever possible. It was still open to the magnanimous chairman of a board to open the bowling with one or two long-hops on the leg by inviting a candidate's opinion of things well within the range of his declared experience. Like the Admiralty, the BBC allowed selection interviews to continue for reasons of courtesy and the appearance of fairness, when strictly functional considerations would justify their foreclosure.

Mrs B. N. E. Roberts (formerly BBC) asked how Mr Whitley thought one could assess the ability of an applicant when dealing with two artists of different temperament and personality at the same time in the same room.

Mr Whitley recognized that it was not easy to predict how anyone would react to stressful and distracting situations without seeing them actually in such situations. Selectors could make some legitimate deductions from records of experience and answers and reactions to pointed questions. He was not convinced that any more could be relied on to emerge from artificially simulated situations. There was always the probationary period.

In thanking the speaker, the Chairman said that his paper had been a judicious blend of the practical and the philosophical. It had rightly stressed that the purpose of an interview was to elicit all the relevant facts and to provide a fair basis for an assessment of character and potential. It was of cardinal importance to make it easy for the candidate to give of his best. This meant special emphasis on two requirements: first, that the interviewer should have well-developed human qualities of sympathy and understanding and second, that each interview should be meticulously prepared in advance. The Chairman also thanked Mr R. L. Collison and the Librarians of the Library Association, the British Institute of Management, and of Aslib for their help with the bibliography and exhibition of literature on interviewing.

Letters to the Editor

JAPANESE TRANSLITERATION

Dear Madam,

I find it difficult to follow Mr Roscoe's argument in the letter which you published in *Aslib Proceedings*, vol. 15, no. 5, May 1963, at page 147. Can he suggest any means of transliteration of Dr Yosioka's name (which is, of course, normally written as two Japanese characters, not as four *kana* syllables) which is necessarily superior to the one he questions? If he prefers 'Yoshioka', perhaps he would explain why.

His remark concerning the Japanese system of orthography scarcely merits discussion.

Yours faithfully,

J. B. SYKES

46 NorthCourt Road,
Abingdon, Berkshire
17th June 1963

MONITORING CURRENT TECHNICAL INFORMATION

Dear Madam,

As most abstracting services do not issue concurrent subject indexes with abstracts, it seems reasonable to describe the situation as one in which comparatively low priority is given to subject indexing. Why this should be 'almost incredible' and 'simply not true' to Mr A. H. Holloway, I do not know.*

On the question of retrospective searching, I note that Mr Holloway has felt able to make an evaluative comparison of the indexes to *Chemical Abstracts* with BTI, even though the first BTI volume for retrospective search had not yet appeared at the time he wrote.

Yours faithfully,

E. J. COATES,

Editor, British Technology Index

The Library Association,
Argyle House, 29-31 Euston Road, London NW1
28th June 1963

* *Aslib Proceedings*, vol. 15, no. 6, June 1963, p. 195.

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The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

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THE UNIVERSITY OF LANCASTER. Applications are invited from Chartered Librarians, or from those who have passed at least three parts of the Registration Examination, for two posts of SENIOR LIBRARY ASSISTANT. Salary will be on the scale £675-£1,350, but a Chartered Librarian will receive an initial salary of not less than £850. Applications (six copies) together with the names and addresses of three persons to whom reference may be made should be sent not later than 31st August 1963, to the Secretary to the Executive Council for the University of Lancaster, P.O. Box 78, County Hall, Preston, Lancashire, from whom further particulars may be obtained.

Wanted

J. HOUBEN. *Das Anthracen und die Anthrachinone*. Leipzig, Georg Thieme, 1929; or 1945 re-publication by Edwards Bros of Ann Arbor, USA. Librarian, James Anderson & Co. (Colours) Ltd, Hawkhead Road, Paisley.

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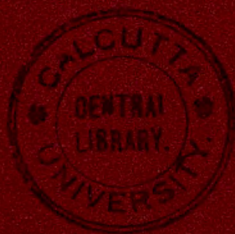
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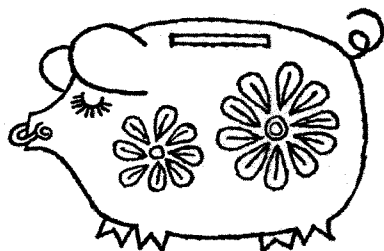
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ASLIB PROCEEDINGS

incorporating Aslib Information



Volume 15

September 1963

Number 9

ASLIB CALENDAR 1963

September

TUE.24 - THUR.26. 37th Annual Conference at St Andrews.

October

FRI.11. Biological Group conference at British Museum (Natural History). See paragraph below.

TUE.15. Chemical Group sherry party at Aslib.

WED.16. Evening meeting at Royal Aeronautical Society, 5 for 5.30 p.m. 'Research programmes and activities in information retrieval at Western Reserve University', by Alan Rees. See paragraph below.

WED.16. Evening course on handling Russian literature begins.

THUR.17. Electronics Group visit to TIL.

THUR.17. Technical Translation Group meeting at Aslib, 10.30 a.m., New Russian iron and steel terms.

TUE.22. Evening meeting at Aslib, 5 for 5.30 p.m. Scientific and technical information in the USSR: report on DSIR/Aslib visit. Dr W. L. Francis in the chair. See paragraph below.

THUR.24 - FRI.25. Course on the trade literature collection.

November

THUR.7. Technical Translation Group sherry party at Aslib.

FRI.8. Aeronautical Group Winter meeting at Ministry of Aviation, St Giles Court, and sherry party at Royal Aeronautical Society.

MON.11 - FRI.15. Senior introductory course to special librarianship and information work.

THUR.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'The production of library publications—"do-it-yourself" methods, not editorial procedure', by S. B. Page.

December

WED.18. Aslib Christmas sherry party.

January

1964

TUE.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'Sheffield School of Librarianship', by W. L. Saunders.

Aslib Evening Meetings

'Research programmes and activities in information retrieval at Western Reserve University' is the subject of the next evening meeting, on Wednesday 16th October. The speaker will be Mr Alan Rees, Manager, Research Resources, Center for Documentation and Communication Research of the Western Reserve University School of Library Science. Mr Rees, who will be on a brief visit to England in October, has accepted an invitation to speak to an Aslib audience, and will describe the research on information techniques which is being carried out at the Center for Documentation. The chair will be taken by Mr C. W. Cleverdon, Director of the Aslib Cranfield Research Project.

This meeting will be held at the Royal Aeronautical Society at 4 Hamilton Place, London W1, at 5.30 p.m., and tea will be served at 5 p.m. Application forms to attend the meeting were circulated with the August issue of *Aslib Proceedings*; any members who did not receive a form and would like one are asked to apply to the Meetings Organizer at Aslib.

Under an Anglo-Soviet Cultural Agreement providing for exchanges of specialists in various fields, the Department of Scientific and Industrial Research and Aslib sponsored a delegation of technical information officers which visited the USSR in June 1963. The team was under the leadership of Dr W. L. Francis, C.B.E., of DSIR, who has agreed to arrange a talk about the visit, to be given at the Aslib evening meeting on Tuesday 22nd October. The other members of the team were Mr D. V. Arnold, ICI Heavy Organic Chemicals Division, Mr C. W. Cleverdon, Cranfield Research Project, Mr R. Sewell, The United Steel Companies Ltd, Dr D. J. Urquhart, National Lending Library for Science and Technology, and Miss M. Webb, Patent Office Library; and it is hoped they will be present to contribute to this talk.

The meeting will be held at 3 Belgrave Square, London SW1, at 5.30 p.m., and tea will be served at 5 o'clock.

The Trade Literature Collection

Trade catalogues and other similar publications often contain valuable information which is not available from other sources. Yet they are often overlooked and neglected owing to the difficulty of obtaining them, and of organizing them and integrating them with other sources of information. To help members overcome these difficulties Aslib is organizing a short course to be held on Thursday and Friday 24th and 25th October. Various ways of obtaining and organizing trade catalogues will be discussed by experts, and their exploitation in information work in relation to other types of literature will also be discussed. There will also be visits to different types of trade catalogue collections and a general discussion of the issues raised by the course. The fee for the course will be 5 guineas. A programme is contained in this issue, and applications should be made on the form enclosed in it.

Biological Group

The first one-day conference of the Biological Group will be held on Friday 11th October at the British Museum (Natural History), Cromwell Road,

London. Dr Charles W. Shilling, Director of the Biological Sciences Communication Project, Washington, DC, will speak on biological information services, and Mr G. Lloyd, of the British Standards Institution, on the revision of the biological schedules of the Universal Decimal Classification. Would any new or intending members of the Group who would like to attend the conference and obtain copies of the programme please write to the Hon. Secretary, Miss P. I. Edwards, at the British Museum (Natural History), Cromwell Road, London SW7.

• Electronics Group

A visit to TIL has been arranged for the afternoon of Thursday 17th October. The visit, which will be limited to UK nationals, will cover only the section dealing with unpublished research and development reports, TIL 1 (a) and TIL 2, and will last from 2.30 p.m. until 5 p.m. Fuller details are being published in the Electronics Group Newsletter.

A record number attended the fifth Annual Conference of the Electronics Group at Ashridge College from 14th to 16th June. The proceedings opened with an instructive and entertaining talk by Mr C. B. Wood of the BBC Research Department on 'Principles of colour television'. Mr Wood and his staff had gone to a great amount of trouble to provide a fascinating demonstration of colour television.

The Saturday morning session, on information retrieval, provided two contrasting talks. Mr A. E. Cawkell of Cawkell Research & Electronics Ltd discussed a 'Simple information system for use in a research and development laboratory'. This was a practical approach developed for a small concentrated laboratory where management was not prepared at that stage to support a trained information officer/librarian. Dr J. A. Schüller, who, as head of the Netherlands Armed Services Technical Documentation and Information Centre, controlled a much larger organization, spoke on 'The TDCK-Compact System and its associated thesaurus'. His ability to express himself clearly in a foreign tongue and his touches of humour were most impressive.

Mr Julian Blackwell altered his theme as given in the programme to cover information services and industry and described his efforts to make top management information minded. Other sessions were 'Lasers and masers' by Mr C. S. Brown of GEC Hirst Research Centre, and an absorbing account by Mr J. E. Wright of some of the early works on magnetism and electricity in the Institution of Electrical Engineers library, extremely well illustrated by coloured slides.

Film Libraries Group

The Executive Committee of the Aslib Film Production Librarians Group has announced a change in the title of the Group, which is now the Aslib Film Libraries Group.

The reason for this change is that the activities of the Group have attracted the attention of film librarians in charge of distribution libraries, as well as people in other types of library who administer collections of films. The future activities of the Group will therefore be designed to cover film libraries of all

types and their staffs, including new entrants into the profession. This broadening of interests will not only enable film librarians generally to meet regularly to exchange information and for talks and discussions, but will also enable new staff to gain an understanding of the nature of the materials they deal with, and an introduction to the best methods of handling, control and storage.

The Group was formed in June 1955. After a paper read by Sir Arthur Elton—in which he pleaded for recognition of the work of film libraries—at the Aslib annual conference that year, a meeting of representatives of film production libraries was called and this led to the establishment of the Group.

Papers presented at the Group's regular meetings have been published in *Aslib Proceedings* and the *Journal of Documentation*; speakers have included personalities such as Mr John Halas and Mr Stuart Legg, as well as film librarians and others interested in film documentation.

The Group recognized the immediate need for a directory and the first edition of the *Directory of film production libraries* was compiled and published in 1959; a second edition is in preparation. The need for standardization in film cataloguing was equally appreciated; a Cataloguing Committee was formed in 1959 and a code of *Film cataloguing rules* has been compiled by the Committee and published by Aslib (see *Aslib Proceedings* for July 1963, p. 202-3). These rules have already been adopted by the new *British National Film Catalogue*. Film librarianship has its own language and consequently the rules contain definitions of terms that are in general use in film libraries.

The first-ever course of film librarianship was organized by Aslib in collaboration with the Group and took place in June 1963. The subjects covered included administration, acquisition and selection, classification, cataloguing and indexing, and the use of the material. The lectures were illustrated by visits to different types of film library. The speakers included Sir Arthur Elton; Mr Bernard Chibnall, Editor, British National Film Catalogue; Mr David Francis, Deputy Curator, National Film Archive; Mrs Anne Hanford, Assistant Librarian, BBC Television Film Library; Mr David Grenfell, Chief Cataloguer, National Film Archive; and Mr John Mountford, Supervising Librarian, Associated-Rediffusion Ltd. The course was extremely successful and arrangements will be made to hold another one next year.

The Cataloguing Committee of the Group is at present making a study of alphabetical subject cataloguing. It also has in preparation a manual of film library technique—a textbook that is urgently needed for the training of new entrants to the profession.

The Chairman of the Aslib Film Libraries Group is Miss Peggy Dowling, Chief Film Librarian, Film Centre (International) Ltd. Details of membership of the Group and its activities can be obtained from Mrs R. L. Sauvée, Liaison Officer, Aslib; or from the Group's Hon. Secretary, Mrs Anne Hanford, BBC Television Film Library, Ealing Green, London W5. All who are interested in film librarianship are invited to apply.

Reprint of a Paper given at the Aslib 36th Annual Conference, 1962

The paper 'A computer-integrated system for centralized information dissemination, storage, and retrieval' given by Mr R. J. Tritschler at the Aslib

36th Annual Conference, 1962 (*Aslib Proceedings*, vol. 14, no. 12, December 1962, p. 473-503) is now available as a reprint from the author, IBM Data Systems Division, Development Laboratory, Department A39, Building 946, Ext. 479-G, P.O. Box 390, Poughkeepsie, New York, USA (free of charge).

List of Terms in Electronics

A new edition of the 'List of recently coined terms in electronics for librarians and information officers in electrical and electronic engineering' will shortly be issued. It will contain twice as many entries as the previous edition and the charge will be 5s or \$1.00 to members of Aslib, 7s 6d or \$1.50 to non-members. Orders may be sent to Miss B. Newman, Head of Information and Publications Department, Ericsson Telephones Limited, Beeston, Nottingham. Cheques and postal orders should be made payable to Aslib Electronics Group.

Nato Course on Automatic Document Analysis

From 7th to 20th July Nato held an Advanced Study Institute on Automatic Document Analysis on the island of S. Giorgio Maggiore, Venice. Sixty-nine participants from eleven countries attended, sharing between them six mother tongues. All the proceedings were in English or French with occasional interpretation; no other language was used. This linguistic difficulty was aggravated by the fact that several different terminologies from the fields of linguistics, logic and/or mathematics, automatic document analysis, and information retrieval, were used in the forty-three lectures and seminars.

Among the most interesting of these were the ones given by J. C. Gardin, R. M. Needham, V. Giuliano, R. F. Barnes, G. Salton and D. R. Swanson. Calvin Mooers was a lone voice among the lecturers in trying to bring the discussion back to the practical and conventional problems of information retrieval, documentation and librarianship. Some of the others were avowedly and properly concerned with document analysis as a useful exercise for testing and developing computers. Many were genuinely concerned with discovering the optimum use of men and machines together in solving problems of information organization and dissemination.

The proceedings in full are to be published and Mr Wilfrid Lancaster is preparing a paper on 'automatic document analysis' which will be presented at one or more Aslib meetings, probably early in 1964.

International Film Congress in Rome

The Seventeenth Annual Congress of the International Scientific Film Association will be held in Rome from 5th to 12th October. The Congress provides a meeting place for scientists and film makers from all over the world and one of its highlights is a Festival of Films presenting Science, at which about 250 new scientific films will be shown. Requests for information about the Congress should be made to the Scientific Film Association, 55A Welbeck Street, London W1.

OECD Conference

From 7th to 9th October, in Stockholm, immediately following the FID Conference, OECD is holding a conference on the 'Communication of scientific

and technical knowledge to industry'. It is addressed primarily to consumers of information, and delegates are being chosen from official nominations. Further information may be obtained from the Overseas Liaison Group of the DSIR, Africa House (telephone Holborn 3422, extension 122).

IASLIC Conference

The fifth conference of IASLIC (Indian Association of Special Libraries and Information Centres) will take place this year at the Poona University Library, from 21st to 24th October, with Dr S. R. Ranganathan as its President. Two special symposia have been planned, on 'Document and data processing in academic, research and special libraries' and 'Problems and prospects of library associations in India'. Details about the conference may be obtained from Mr G. B. Ghosh, the Honorary General Secretary of Iaslic, at the Geological Survey of India Library, 29 Chowringhee Road, Calcutta 16, India.

Course in Special Librarianship

The Manchester School of Librarianship is offering a basic course in special librarianship and information work similar to its course held in 1961-2. This is a part-time evening course intended to meet the needs of new entrants to special librarianship. Lectures will be held weekly on Tuesday evenings from 6 p.m. to 8 p.m., beginning on Tuesday 1st October. There will be approximately twenty-eight lectures in all, and further details may be obtained from the Head of the Department of Librarianship, Manchester College of Commerce, 103 Princess Street, Manchester 1.

NANTIS Handbook

The first edition of the *NANTIS handbook and directory of resources* is to be published at the end of September. It will describe the resources of the seventy-two member libraries of NANTIS (Nottingham and Nottinghamshire Technical Information Service). Copies can be purchased by non-members of NANTIS, at a pre-publication price of 10s, or 12s 6d after 1st October, and orders should be sent to the Hon. Secretary, Mr F. C. Tighe, at Nottingham Central Library, South Sherwood Street, Nottingham.

Patent Office Publications

The following progress report has been received from the Printing and Publication Branch of the Patent Office, covering Patent Office publications for the six months ending 30th June 1963.

Specifications. 15,760 were printed and published.

Abridgements. 548 sixteen-page sheets were printed and published.

900,001-920,000 Series (last specification on sale 27th February 1963). The remaining 388 sheets in the series were distributed during the period January/April. Distribution of thirty-eight groups was completed by 2nd April and the other six groups were completed by 30th April.

920,001-940,000 Series. 160 sixteen-page sheets were distributed during May and June.

Abridgement volumes—subject matter and name indexes

900,001-920,000 Series. Distribution of the indexes commenced 26th March 1963 and was completed by 6th June 1963. The first nine bound volumes were available on 30th May and thirty-five groups were with the binders. Distribution was completed during July.

Group allotment index—900,001-920,000 Series. This was distributed on 27th March 1963.

Consolidated name index—900,001-920,000 Series. This was distributed on 25th April 1963.

Protection of Libraries against Fire

The Library Technology Project of the American Library Association has published the report of a two-year study on the protection of libraries against fire and other losses, *Protecting the library and its resources: a guide to physical protection and insurance*. (LTP publication no. 7.) The study was designed to accomplish four major objectives: development of methods for arranging the storage of library materials so as to incur minimum hazard from fires, water damage, and other causes of loss; development of design criteria incorporating known principles of safety to be applied to new library construction and rehabilitation of existing buildings; preparation of a model insurance policy designed specifically for libraries; and preparation of a manual to assist librarians in the purchase of insurance and the physical protection of their property. This report, the first extensive treatment of an important subject, is available from the Library Technology Project, American Library Association, 50 East Huron Street, Chicago 11, Illinois, USA, price \$6.

Guide to Reference Books

A fourth and final supplement to Constance M. Winchell's *Guide to reference books*, 7th ed., has been published. It covers 1,300 reference titles published from 1959 to June 1962, and follows the selection principles and organization of the basic volume and earlier supplements with cross references to them, with due attention paid to Russian and East European materials. Work is now in progress on the eighth edition. The supplement is available from the American Library Association, 50 East Huron Street, Chicago 11, USA, price \$3.75.

Library Furniture and Equipment

The American Library Association's publication with this title is a report of the proceedings of a three-day Institute sponsored by the Association's Library Administration Division. It deals with furniture selection; book stack selection; specification writing and estimating procedures; equipment and methods for catalogue card reproduction, for photocopying, and for production of full-size copy from microtext. The report is available from the ALA Publishing Department, 50 East Huron Street, Chicago 11, Illinois, USA, price \$1.75, paperback.

Business Efficiency Exhibition

More than £10 million worth of modern business machines and equipment will be displayed at this year's Business Efficiency Exhibition, to be held at Olympia from 1st to 9th October. A wide range of equipment designed to increase office efficiency will be shown, for instance electronic computers (including some library computers), dictating equipment and office printing and composing machines. The exhibition will be open daily from 10.30 a.m. to 7 p.m. (except on Saturday 5th October when it will close at 4 p.m.); admission will cost 2s 6d.

Rutgers Documentation Seminars

The first two of the Rutgers Seminars on Systems for the Organization of Information have now been announced, for 31st October to 1st November and for 5th to 6th December. The first will be led by Mr Jack Mills of the Aslib Cranfield Research Project, who will be presenting the Universal Decimal Classification. At the second in the series, Dr J. C. Gardin, Director of the Section on Automatic Documentation of the Centre National de la Recherche Scientifique, will discuss Syntagmatic Organization Language, or SYNTOL.

Full information on the Rutgers Seminars may be obtained from Seminars on Systems for the Organization of Information, Graduate School of Library Service, Rutgers, the State University, New Brunswick, New Jersey, USA.

The principal investigator for the seminars is Dr Susan Artandi, replacing Dr Theodore C. Hines who is leaving Rutgers to become Special Assistant to the Dean, Columbia University School of Library Service.

Sira Symposium

Sira (the British Scientific Instrument Research Association) is to hold a one-day symposium on science and information, on Wednesday 30th October. Anyone whose work entails the extracting of scientific information—particularly about instruments and instrumentation—is cordially invited to attend. Among the speakers will be Mr G. Davies, Editor of *Instrument Abstracts*, Mr C. H. D. Templeman, Editor of *Sira Review*, and Mr C. W. Hanson, Head of the Research Department at Aslib.

The symposium fee is 15s for members of Sira and 30s for non-members. Copies of the programme and application form (which should be returned to Sira not later than 30th September) may be obtained from Mr D. E. Colman at Sira, South Hill, Chislehurst, Kent.

Technical Report Writing

A series of three-day courses on how to write technical and research reports is run by OTMA Management & Sales Training Consultants, and the dates of the next courses will be Wednesday 23rd–Friday 25th October and Wednesday 27th–Friday 29th November. Full details may be obtained from the Course Secretary, OTMA, 6 Carlos Place, Grosvenor Square, London W1 (telephone Hyde Park 5121).

New Research Services

The Scientific Documentation Centre at Dunfermline has announced some new technical services which are now fully operating. These include a current awareness service (which is confidential) to provide up-to-date information on requested subjects; and a spectra collection and a spectra search service. Details may be requested from Dr P. S. Davison, Director, Scientific Documentation Centre Ltd, Halbeath House, Dunfermline, Fife.

International Conference on Cataloguing Principles

The full *Report* of the ICCP (held under the auspices of IFLA in 1961) is being published in September. The report will contain 300 pages and will cost 3 guineas a copy; there is a reduced price of 2 guineas, plus a cost of carriage, for bulk orders through national cataloguing committees and library associations. Orders should be sent to the Organizing Committee, International Conference on Cataloguing Principles, c/o National Central Library, Malet Place, London WC1.

NEW MEMBERS

CORPORATE

<i>Name</i>	<i>Locality</i>	<i>Representative</i>
Alginat Industries Ltd	London	Miss E. Isaac
British Northrop Ltd	Blackburn	K. H. Hill
Erwin Wasey, Ruthrauff & Ryan Ltd	London	Mrs M. M. Miel
Essex, University of Essex	Colchester	P. Long
Glamorgan College of Technology	Treforest	R. T. W. Denning
Gulf European Company	London	H. M. Vaughan
Gypsum Industries Ltd	Dublin	A. Briescu
Libya, College of Advanced Technology	Tripoli	Dr Pauline Langley
National Cash Register Co. Ltd	Boreham Wood	Miss M. K. Moinet
Nathan & Rosselli	London	A. J. McDonald
Perth Public Libraries	W. Australia	C. C. Florey
Rainbow Ink & Varnish Mfg. Co. (Pvt.) Ltd	India	N. L. Contractor
Gordon Rayment & Co. Ltd	London	V. A. J. Gifford
Southampton College of Technology	Southampton	J. A. Dearden
Southgate Technical College	London	S. A. Knox-Hooke
Steels Process Plants Ltd	Pinner	T. Carpenter
Twyford Laboratories Ltd	London	Miss R. Aicher
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INDIVIDUAL

<i>Name</i>	<i>Locality</i>
Captain D. Hunt	Bromley
Mrs C. Stein	Manchester

LANGUAGES IN DOCUMENTATION

RHYS MATTHEWS

Information Officer, Technical Information Service, Central Electricity Generating Board

Aslib Northern Branch Conference, Harrogate, 25th-27th April 1963

THE LANGUAGE PROBLEM

IN approaching the problem of languages—of how they affect communications in general and documentation in particular—there is a strong temptation to draw an analogy with the wheelbarrow (but with apologies to the wheelbarrow, which did in fact represent an advanced development in the evolution of transport). Language is nothing more than the wheelbarrow stage in communications, and there the matter has rested. We must remember, when we are discussing languages, that we are merely making the best of a primitive development which, sooner or later, will have to be superseded if it is not to choke further human advance. The flood of information or *plague of print* which we hear so much about is only felt as such because of the antiquated vehicle we continue to employ for handling it. To illustrate, if we were still restricted to wheelbarrows for manhandling all the goods of the world we should now be talking about the *plague of commodities* instead of the shortage of freights.

Since earliest times language has been both an aid and an obstacle to human development. Some kind of primitive speech must have accompanied man's very earliest attempts at classification. In the beginning one grunt would no doubt signify *come hither* and another *scram*, thus establishing a simple division of reactions into two groups, or rather three, the third reaction being conveyed by no grunt at all and signifying *who cares anyhow*. The attainment of this level of sophistication only served to inspire still greater subtlety of expression, and names were attached to objects in line with the reactions they induced—a practice we still employ with striking effect.

Spoken language in itself was already an immeasurably important social asset, allowing experiences and knowledge to be pooled on a tribal and inter-tribal basis, thus endowing each individual with the total know-how attained by the tribe. However, the absence of any recording device other than an extremely fluid memory meant that the store of wisdom was restricted to what could be passed on by word of mouth from one generation to the next. Nothing went down in 'black and white', and everything that happened more than a few yards away and a few days away would have little more than the strength of hearsay or rumour; hence the legends and hobgoblins which represented the 'science' of relatively recent times. Shaky and fantastic as these beliefs appear to us today, they nevertheless represent the apex of human achievement at that stage. The information centre in which such 'knowledge' was vested was usually the oracle or witch doctor. Whether we like it or not, it is he who must be considered as

the ancestor of modern information services and to him we owe the subsequent stages of development. Which accounts for much.

It is the printed language which mainly concerns the library and information service, and it was the printed word that made them necessary, because of the massive accumulations of recorded knowledge which printing made widely available. Libraries existed before printing, of course, but not in the way we know them today.

Foreign languages are a nuisance. It would be wrong however to think that all language problems are foreign ones. Each language has its own inherent weaknesses, and these shortcomings multiply the difficulties of translation several times over. Some of these shortcomings affect documentation long before languages in the plural enter into it. When words are your living you quickly learn what precarious situations they can produce. Apart from the anomalous structures of word and phrase which can only be justified on the grounds of convention, a language is found to be crippling inadequate when an attempt is made to analyse and classify a document by employing words in a dictionary-index fashion. It is found that a word does not represent a precisely defined situation but more often suggests a general vague idea; it frequently represents several different vague ideas, sometimes embracing opposite senses. As new specializations develop, existing words are pressed into service to convey new meanings. All this goes on alongside the normal rough usage which language suffers in everyday careless and exaggerated speech.

Taken all in all, a language is a very crude tool—but the only tool which is generally available to describe extremely precise and complex situations. Armed with this experience of one's own language, it is easier to appreciate the pitfalls of any simplifying approach to the translation problem. It can be seen that the irregular rough-and-ready nature of the different languages renders translation from one into another more difficult, and the result, employing the best of skills, may be inaccurate and dubious, there being no exact equivalence between languages.

The slipshod character of a living language has been brought as an argument against the creation of an artificial international language, since, it is said, such an ordered language would similarly degenerate when brought into everyday use. Whether such an artificial language could be kept in line by a governing body—an international version of the French Academy—is doubtful, even if it were supported by an adequate team to intimidate offenders.

FOREIGN LANGUAGES

In matters of technical information, foreign languages impose themselves with an insistency out of all proportion to the position of two or three decades ago. Science and technology have progressed and expanded everywhere to the extent that the world's technical literature now amounts to some two million papers a year. The proportion of important papers which appear in English has progressively fallen, not because of any diminution in the English-language contribution, but rather because foreign industrial development has been steadily catching up with that in Britain and America.

English is of course current in some very important areas of the globe and

about half the world's output of new scientific and technical papers is in English. To evaluate the other half, in foreign languages, it is useful to turn to the experience of the technical information services attached to the different industries. These information services are well placed for finding out whether equivalent English material already exists before passing a foreign paper for translation. They are also in an ideal position to make a preliminary assessment of a foreign paper before translation, in consultation with the specialist. In the electricity supply industry alone, some five hundred papers are passed for translation each year, and a further five hundred are recorded as translated by the research organizations, manufacturers and other concerns associated with the electric power industry. This is just one example taken from a forward looking industry with a relatively high level of technical literacy. Further examples can be found in chemicals, steel, nuclear research, and other industries. The appreciation of this service by working scientists and practising engineers leaves no doubt that the operation is economically sound.

RELATIVE IMPORTANCE OF FOREIGN LANGUAGES

It was estimated above that roughly half the new scientific and technical literature is in foreign languages. It is important, however, to recognize that this proportion varies enormously from subject to subject. In some specialist fields it may be found that as much as 90 per cent of the important material comes from abroad, where most of the work is being done in that field. In other subjects, the foreign literature may not merit more than a watching brief, and provide no more than a repetition of work reported from the English-speaking area.

It is difficult to specify the fruitful fields and the less promising ones, in the absence of sustained and equal efforts directed at testing the relative returns to be expected from a search of the foreign literature in given subjects. Interest in overseas research and development can fluctuate very much from industry to industry and from firm to firm.

Not sufficiently taken into account is the relative importance of the different foreign languages where they affect specific industries or particular branches of science. There are usually sound economic and topographic reasons why a certain country should be well advanced in certain fields of research and, whilst some languages may in general be more frequently employed than others, analysis may show that, for example, chemistry interests will gain more from German, while there are several branches of physics which make more demands on Russian.

Three foreign languages stand out for their usefulness in science and technology. These are German, Russian and French; and it is likely that frequent recourse to all three will be necessary whatever the subject or industry being served. It would be difficult to place them in any strict order of importance, and the value of each should be based on different considerations; French, for example, owes its position largely to its currency in international conference proceedings and committees as against German and Russian with their impressive output of valuable technical and scientific publications.

Spanish falls lower in the order of priority than might otherwise be expected (bearing in mind that we are concerned here with languages only as applied to information). The extensive Spanish-speaking areas of the world do not yield sufficient significant literature to put Spanish among the most useful languages in this respect, although it is very important in the commercial field.

French, German and Russian together account for three-quarters of the foreign language material in science and technology. The remaining quarter is subscribed by a dozen runners up, comprising—roughly in this order—Italian, Czech, Dutch, Hungarian, Japanese, Polish, Swedish, Spanish, Danish, Norwegian, Rumanian, and Serbocroatian. During the last ten years, it is unlikely that you would have been involved to any extent in other languages, and you would not have been unduly embarrassed by an ignorance of Chinese, Turkish, Portuguese, Welsh, Arabic, Urdu, Greek, Hebrew, Sanskrit or Latin.

To sum up, fifteen foreign languages should meet practically all the requirements of foreign technical literature. A mastery of the three principal foreign languages will meet three-quarters of the needs. Roughly speaking, a knowledge of one of these will satisfy one-quarter of the requirements.

USING THE FOREIGN TECHNICAL LITERATURE WITHOUT RECOURSE TO FOREIGN LANGUAGES

Quite a lot has been done by pioneers in the information field to provide access to foreign literature without involving knowledge of the language concerned. The most comprehensive provision takes the form of complete cover-to-cover translations of foreign periodicals, copy for copy, as they are issued. Unfortunately there are only about a hundred and fifty of these, mostly from the Russian. The majority are published by American and British institutions and research organizations, frequently with government sponsorship and financial aid. On a national economic level this is probably by far the most efficient way of dealing with the problem and cuts out the very costly, time-consuming and haphazard process of assessing which of the papers is worth translating.

Another method consists in making full use of the thousands of separate translations which are made by some hundreds of different organizations, for example the services for co-ordination and listing of translations provided by the National Lending Library for Science and Technology.

Next there are the abstracting services such as *Science Abstracts* which embrace the scanning of foreign periodicals. Some countries publish abstract bulletins to cover their own technical journals, and some journals have English abstracts. Finally there are agency services which supply titles and abstracts from specific journals on request.

WORKING IN THE FOREIGN LANGUAGE FIELD

If these three ready-made approaches—cover-to-cover translations, translation lists, and abstracts—are all properly worked and still leave you without any result whatever, then you are indeed unlucky. On the other hand, only the extremely fortunate will be so well accommodated in this way that nothing else will remain to be done. Some foreign periodicals will still be essential to the

particular interests in mind. How many, in which languages, and which specific journals, are all factors to be determined by the circumstances—the use to which they will be put, the foreign language skills of the staff and perhaps even how much money is available.

The starting point of this operation is the acquisition of foreign scientific and technical periodicals and other material including books. We will concentrate on the periodicals, since they provide the most consistent bulk of topical information and are frequently a guide to books and random publications. The next step is to draw up a list of the periodicals necessary to the subject field and programme of the organization or industry being served; and then to take into account the available personnel having an adequate knowledge of the languages and subjects entailed.

Ideally the list of journals should be drawn up first. If it has to be modified or even scrapped in the face of inadequate staff resources, then so much the worse. We shall at least have done our part and the onus of the final outcome will be on the decision-making body carrying authority to grant or deny working resources. On the other hand the list finally adopted will depend on the success achieved in securing the right kind of staff. As a result, practices vary from place to place; at one extreme, the only scanning of foreign journals which is done is undertaken by the research workers themselves and indeed the journals may be taken individually and initially for them, at their request. More usually the journals are scanned in the information service and abstracts are made of the papers of interest to the organization; or perhaps only the titles of the papers are translated and circulated.

With the exception of those relatively few foreign journals which contain English abstracts, there will be no purpose in taking a journal unless it can be read by someone connected with the particular organization, and it will be necessary to decide forthwith which languages can be dealt with either now or in the event of further help being provided. German, French and Russian should be aimed at as a minimum. It is also likely that, at this point, other languages will be at hand by chance: a French translator, for instance, may have a serviceable knowledge of Italian or Spanish.

It should now be easier to decide which journals should be taken regularly. In the final choice, judgement would be based on personal knowledge of the literature; on a search through the abstracting bulletins; and on advice, from engineers, chemists and scientists in the field, from other information and library people, and of course from Aslib.

As in all aspects of library and information work, liaison can achieve economies and a bigger end-result. Right from the outset this might take the form of co-operating with other organizations that have similar interests and in sharing out responsibility, perhaps by allocating the treatment of certain languages or certain journals to the one organization and others to another. Public libraries would have to consider sharing responsibility on a language basis or on a subject basis, or perhaps both. Already many public libraries in the provinces have a local technical bias in line with the main local industries. Some of the London libraries emphasize different languages, but only for the purposes of general literature as distinct from technical.

LANGUAGE TRAINING

The question of reading a foreign paper raises the broader one of policy for language training, and this policy might govern attitudes towards the handling of foreign literature. For example, if it were decided that scientists should learn foreign languages to the extent of being independent of translators, the result might be vastly different from that of a policy which sees the scientist as being fully occupied with his research specialization and relying on information and translation services to perform the necessary linguistic functions. What we actually have at the moment is something in between these two extreme positions. Information services and translators place an amount of translated material at the disposal of the scientist population whilst at the same time a small number of scientists supplement this effort by scanning some of the foreign literature themselves.

The exact number of scientists who should be trained to read foreign languages cannot as yet be decided. It is argued that a scientist can acquire a reading knowledge of a foreign language with reasonable time and effort, and ought therefore to do so. From the other side it is argued that this is rarely the case, and on a national scale the millions of scientist-hours which might thus be spent would be better applied to scientific pursuits, linguistic functions being more economically performed if concentrated within central translation organizations.

The problem is not simple or straightforward, and it might be difficult to advance it to any position beyond the present arbitrary state of affairs, maintaining the mixture as at present but striving to double or treble the doses all round. It is however worth while throwing some light on one or two of the issues which are debated so inconclusively from time to time. The translator will say that translating is one of those skills on which high pronouncements are made at levels far removed from the processes themselves. Consequently, decisions are taken with only the vaguest appreciation or knowledge of the various implications, arrived at by a series of intermediaries whose first-hand knowledge of the subject vanishes progressively as the point of decision is approached.

In assessing the need for a translation service, both now and in the future, it will be useful to know to what extent the ultimate consumer, i.e. the scientist, is able to do his own translation work; and further, what effort would be required in order to equip scientists with a greater level of language ability.

To consider first the situation as it actually exists today, experience shows that the scientist who can read a foreign language is a sufficient rarity to be pinpointed and named by his colleagues as something exceptional. It is usually the case also that he has something of a flare or inclination for languages quite apart from his job, with the result that he may have acquired some knowledge of not only one foreign language but two or three—if only a smattering. Many scientists have studied a language at some time or other, and forgotten it. Some have made varying efforts in adult life either to start or resuscitate a foreign language, but without achieving much. Indeed the percentage of scientists who can read with any facility, even in their own subject, is surprisingly small. Most of them have found the study of languages both tedious and difficult, requiring

a much longer period of very close application than is usually appreciated. There is an enormous difference between learning a few set holiday phrases and being able to read the living jargon of a technical paper.

It is not realized that scientific papers are not simple texts. They describe new and complex developments which can only be understood even by a native if his intelligence and knowledge of the subject reach a certain level—and even then only by close concentration. A scientist-cum-linguist has said, 'I can read a Russian text but I cannot study it at the same time—each process separately monopolizes my attention, so to study the paper I need a translation'. Similarly, a translator who has made a good translation, having followed the meaning of each sentence throughout, is frequently ignorant afterwards of the overall argument, having been completely engrossed in the detail work of the translation process. Now if a scientist who knows the foreign language has to make a translation for his own purposes, no saving is achieved as against employing a translator. Indeed it is usually a more costly process, since the translator has developed translation techniques, such as dictation to a tape machine, which cut down the real cost sometimes to a fraction. It is a false economy to turn to some scientist who happens to be around in order to have a translation made, if the result is a tediously executed job with much thumbing through dictionaries and the like—just as it would be uneconomic to employ people indiscriminately on other skilled functions.

In addition to scientists who have learned the language there are of course those whose mother tongue is the foreign language in question. They at any rate can scan journals in their mother tongue. They are not always good translators however, as very few people write really well in more than one language. By the time they have acquired the art—after many years of practice—in their adopted language, they will frequently admit to feeling quite insecure in their earlier language. There are nevertheless exceptional above-average types who achieve excellence in English at any rate, in their own technical speciality; but their time will be fully occupied on other things, unless they take up translation as a job.

Surveys carried out to decide what effort is necessary in order to equip a scientist to make sense of a Russian text in his own subject have yielded the surprising minimum period of forty-five hours compressed within a fortnight, rising to some two hundred hours spread over two years.¹ If this minimum might appear astonishingly low in the light of one's own experience, it should be emphasized that the results of these 'tests' rest on nothing more scientific than a plain 'yes' from the student to the question as to whether he could 'make sense' of Russian papers in his own subject. It could be suggested that the simplest of timed paper tests might have yielded completely different conclusions; it is certain that if technical qualifications were awarded in this manner they would not be worth applying for. It could be said that it all depends on what you mean by making sense.

Whatever the outcome of this question, it is clearly a good thing that scientists should be familiar with foreign languages. How many scientists will succeed, without impairing their application as scientists, is still an open question, but most research organizations do contain a sprinkling of people who have a

language as a second string. Whilst it is true that three foreign languages would be necessary to cope with three-quarters of the foreign literature, mutual aid cannot be ruled out. Nevertheless, a scientist with linguistic ability may have to 'keep it quiet' or 'put up the shutters' to requests from colleagues for help in translation, if he is to avoid ceasing being a scientist in order to become the laboratory linguist.

THE NEXT STEP

Several expedients will be tried and abandoned in the coming years before a decisive advance is achieved in the techniques of documentation and communication allowing of widespread application. So far as languages are concerned, the outstanding development of the last few decades has been the emergence of English versions of about 150 foreign periodicals. We could do worse than encourage this development on a world-wide scale and in a modified form. Let us suppose, for example, that each substantial scientific or technical periodical, in any country and in whatever language, were to agree to adopt a second language of its own choice for the purpose of reproducing the text of the periodical in this language, on facing pages alongside the mother tongue—after the fashion of those bilingual editions of novels which are published in this country and abroad. The cost would not be prohibitive. Availability and sales of the periodical would be enhanced enormously with the two-language choice open to the reader. We should have a growing range of 'international' scientific periodicals and some weeding out of poor-quality ones. Most important of all, foreign literature and foreign languages would enter the scientist's world in a forceful and ever present fashion, to the extent that he might have difficulty in *not* absorbing some of the foreign diet.

A world-wide range of bilingual scientific periodicals could conceivably carry the business some way beyond the present wheelbarrow stage; perhaps to the bicycle stage—a kind of bicycle made for two.

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SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 5 Stratton Close, Hounslow. Hounslow 6954.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

Appointments vacant

BEA—An Assistant Librarian is required for the Library at our London Airport Engineering Base, Hatton Cross, to undertake duties

which include responsibility for a reference section and control of inter-library loans. Applications are invited from women who have completed or are nearing completion of the Registration Examination of the Library Association and have at least two years' experience in a technical or public library on work of a similar nature. Commencing salary £12 13s p.w. with progression to £17 3s 6d p.w. Apply Personnel Officer Engineering (Administration Offices) (AP), British European Airways Engineering Base, Hatton Cross, London Airport, Hounslow, Middlesex.

CHEMICAL LITERATURE. Young lady, preferably with a degree in chemistry, required by international research organization to undertake literature screening and documentation. Reading knowledge of French and German essential. Please reply

with full details to: The Sulphur Institute, 5 Lower Belgrave Street, London SW1.

INDEXER required for *Fuel Abstracts and Current Titles*. Experience in information work essential and background in science or engineering desirable. Applications, in writing, to The Secretary, The Institute of Fuel, 18 Devonshire Street, Portland Place, London W1, from whom further details may be obtained.

For sale

Journals of the American Chemical Society, volumes 74-82 (1952-1960), unbound. Box 763.

Wanted

RABALD, E. *Corrosion Guide*, 1951. Librarian, B.I.S.R.A., 140 Battersea Park Road, London SW11.



TECHNICAL INFORMATION OFFICER

A woman graduate is required to run a small technical library and information service within the Engineering Department at the Company's Group Headquarters.

Candidates should preferably have a good degree in science or engineering, and in addition some experience of providing a technical information service in the field of light engineering.

Experience in the operation of a large technical library will be an advantage.

Salary will be in the region of £1,400 p.a. and general conditions of service are excellent.

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The person appointed should be experienced in reference and information work (U.D.C. used), handling journals, correspondence, report writing and staff control.

Minimum starting salary £850 p.a. with contributory pension scheme and usual large company benefits. Good prospects with possible deputyship.

Please write giving full details of personal background, professional experience and initial salary required to Director of Research,

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MEDICAL INFORMATION SERVICE.

**RECKITT & SONS, LIMITED,
HULL**, maintain an Information Service for the use of those concerned with medical propaganda. They wish to appoint someone to take charge of this Service and invite applications from candidates of either sex, aged 23-30, with the appropriate qualifications and experience.

Inquiries should be addressed in writing to:

**The Personnel Officer,
Reckitt & Sons, Limited,
Dansom Lane,
HULL**

Morganite Research and Development Limited

LIBRARIAN

Morganite Research & Development Limited have a vacancy in their Commercial and Technical Intelligence Department for a Chartered Librarian, who after acquiring experience of the work involved will take charge of a library serving the Morgan Crucible Group. The library's systems are influenced by the co-ordinate index system which the Commercial and Technical Intelligence Department uses to analyse and retrieve scientific, technical, commercial, and patent data, and within a few years the co-ordinate index system will probably be programmed into a computer controlled system.

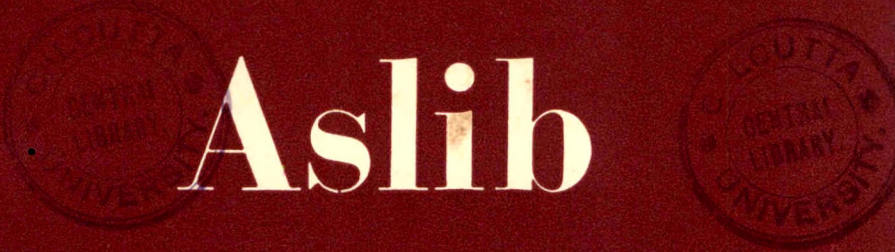
The post calls for drive, adaptability, the capacity to learn, and ability to control a small, highly experienced staff; it will appeal to a man with business sense, eager to develop and apply cost-cutting techniques. Industrial experience, and some knowledge of French and German, would be helpful, but not indispensable.

Applicants should give details of their experience and qualifications, and address their letters to:



**The Staff Manager,
MORGANITE RESEARCH AND DEVELOPMENT LIMITED,
Battersea Church Road, London, S.W.11.**

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Aslib Proceedings

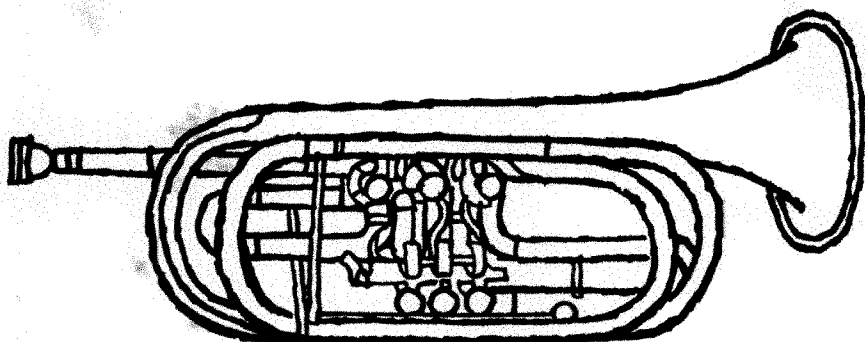
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Aslib Proc. vol.15 no.10 p.273-308 London, October 1963



You to play

We've been blowing our own trumpet long enough. And we'd like to stop . . . make sure the music is right.

Won't *you* give us some lessons?

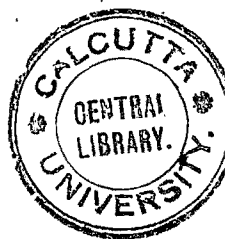
Come to Blackwell's. Write to Blackwell's. Ring Blackwell's. (Oxford 49111.) Tell us what you'd like, and we will play to your tune. We know our range is good, but we want to be sure of hitting the notes *you* like.

Do it soon. Julian (Satch) Blackwell, trumpet in hand, wants to know the score.

BLACKWELL'S BROAD STREET OXFORD

ASLIB PROCEEDINGS

incorporating Aslib Information



Volume 15

October 1963

Number 10

ASLIB CALENDAR 1963

October

WED.16. Evening course on handling Soviet and East European materials begins. (Weekly, until 4th December.)

TUE.22. Evening meeting at Aslib, 5 for 5.30 p.m. Scientific and technical information in the USSR: report on DSIR/Aslib visit. Dr W. L. Francis in the chair.

THUR.24 - FRI.25. Course on the trade literature collection.

November

WED.6. Chemical Group visit to Beecham Toiletry and Pharmaceutical Division Libraries.

THUR.7. Technical Translation Group sherry party.

FRI.8. Aeronautical Group Winter meeting at Ministry of Aviation, St Giles Court, and sherry party at Royal Aeronautical Society. See paragraph below.

MON.11 - FRI.15. Senior introductory course to special library and information work. See paragraph below.

THUR.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'The production of library publications—"do-it-yourself" methods, not editorial procedure', by S. B. Page. See paragraph below.

TUE.26. Chemical Group meeting at Aslib, 5.30 for 6 p.m. 'Patents in the chemical industry', by R. Smither.

TUE.26 - THUR.28. Course on information from the Press. See paragraph below.

December

TUE.3 - FRI.6. Junior introductory course to special library and information work. See paragraph below.

THUR.12. Chemical Group meeting at Aslib, 5.30 for 6 p.m. Paper by a representative of *European Chemical News*.

WED.18. Aslib Christmas sherry party.

1964

January

TUE.7. Electronics Group visit to BBC.

TUE.14. Electronics Group visit to BBC.

TUE.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'Sheffield School of Librarianship', by W. L. Saunders.

Professor D. V. Glass

A welcome is extended to the new DSIR Visitor to Aslib, Professor D. V. Glass, B.SC.ECON., PH.D. He takes the place of Sir John Wolfenden, who is now a Vice-President of Aslib. Professor Glass is Martin White Professor of Sociology of the University of London at the London School of Economics and is Joint Editor of *Population Studies* and of the *British Journal of Sociology*. The other DSIR Visitor to Aslib is Dr T. E. Allibone, F.R.S., who is chief scientist to the Central Electricity Generating Board.

Aslib Evening Meeting

Mr S. B. Page, B.A., A.L.A., Assistant County Technical Librarian, Hertfordshire, will be the speaker at the meeting on Thursday 21st November, on 'The production of library publications'. Many library bulletins, bibliographies and other library publications are not as useful as they should be and fail to make an impact on readers. The deficiencies are partly the result of inadequacies in descriptive content, and partly failure on the part of librarians to make the best use of available duplicating and other copying equipment.

Mr Page will not be concerned with editorial matters but with the practical aspects of producing publications, and will emphasize 'do-it-yourself' methods, excluding the commercially printed publication. The choice of reproduction processes and the economic factors involved will be discussed and the use of typewriters and headlining gadgets for producing copy will be considered. The technical details of duplicating processes will not be gone into, but stress will be laid on the use of photocopying machines in preparing copy and making offset masters. Most of the techniques are applicable to non-library publications.

The meeting will take place at 3 Belgrave Square, London SW1, and tea will be served at 5 o'clock.

Introductory Courses to Special Library and Information Work

A senior introductory course to special library and information work will be held at Aslib from Monday 11th to Friday 15th November. It is intended for staff holding a university degree or similar qualification who have recently started work in an information department or special library, or for people of mature standing put into senior posts in information departments without former experience of the work. It will introduce them to the basic principles governing the production and handling of information and acquaint them with some of the practical details of running an information department or special library. Visits to other libraries and information departments are included in the programme and time is allowed for discussion. The syllabus has been revised in the light of comments made by students who attended recent courses. The fee for the course will be £10.

A junior introductory course will be held at Aslib from Tuesday 3rd to Friday 6th December. It is intended for people who have recently taken up junior posts in special libraries and information departments, and is designed to provide those who are occupied in largely routine duties with an understanding of their work and its place in the organization that will help them improve their

efficiency and give them the incentive to progress to more exacting tasks. The course will include lectures on various aspects of library and information work, visits to other libraries and information departments, and a final discussion session which will take in ways of following up the course with further study. The fee for the course will be six guineas.

Full programmes and application forms for both courses are enclosed in this issue, and intending students are advised to apply early. Provisional bookings will be accepted by telephone. As a general rule, only students possessing a degree or equivalent qualification will be accepted for the senior course and students without a degree for the junior course, but Aslib will be prepared to consider special circumstances. Any intending applicants who are uncertain which course would be most suitable for them should consult the Education Officer, Mr Bird, at Aslib.

Information from the Press

Newspapers are an important source of information in many organizations. Press cuttings form the basic stock of newspaper libraries; and in many other libraries and information departments, such as those of economic intelligence units, advertising agencies, and organizations concerned with current affairs, substantial collections of cuttings are often maintained. These collections present problems not found in other types of information work, and to meet the needs of the staffs in charge of them, Aslib is running a course entitled 'Information from the Press', from Tuesday 26th to Thursday 28th November. The course will cover both the intellectual organization and the physical maintenance of a substantial collection of press cuttings, as well as related topics such as picture collections, photographic reproduction of newspapers and cuttings, and the availability of files of newspapers. A number of visits to newspaper libraries, and to other libraries with press cutting collections, will be included.

The fee for the course will be six guineas to members of Aslib and eight guineas to others. A programme and application form are enclosed with this issue of *Aslib Proceedings*. The numbers on the course are limited and students are advised to apply early.

Aeronautical Group

The winter meeting will be held on Friday 8th November, beginning at 11 a.m. at the Ministry of Aviation, St Giles Court, London WC2. At the opening session, Mr Cyril Cleverdon will give an account of his visit to libraries in the USSR. The next session, at 2 p.m., will consist of a lecture arranged by IBM United Kingdom Ltd about their KWIC indexing system, and will be followed by a demonstration with an IBM 7090 computer at their premises in Newman Street. The meeting will end with a sherry party at the Royal Aeronautical Society, 4 Hamilton Place, London W1, at 5.30 p.m.

Members are asked to make their own arrangements for transport and for lunch, and there will be a charge of 8s a head for the sherry party, payable in advance. The number attending the IBM demonstration might have to be limited and priority will be given to members of the Aeronautical Group, but it may be possible to include a few other Aslib members. Requests for further

information should be addressed to the Hon. Secretary of the Group, Miss M. Dyke, Librarian, Royal Aircraft Establishment, Bedford.

The Aeronautical Group is making a survey of the number of librarians who would buy Aeronautical Engineering Indexes for 1959 and 1960 at about \$20 each if the American Institute of Aeronautics and Astronautics agrees to publish them. Librarians who are not members of the Aeronautical Group but who are interested should get in touch with Miss Dyke at the address given above.

New Classification Society

In April 1962 Aslib sponsored a conference entitled 'Classification: an interdisciplinary problem' (published in *Aslib Proceedings*, vol. 14, no. 8, August 1962). The proceedings of the conference showed that an interchange of ideas on classification between workers in different disciplines was likely to prove of value, and the possibility of setting up an organization to promote such interchange was discussed. As a result, a group of workers interested in classification has decided to found a new organization whose aims will be to arrange interdisciplinary meetings, to produce a newsletter summarizing publications on the principles of classification in all relevant fields, including philosophy and mathematics, and in general to provide information of interest to its members.

The following have agreed to act as officers of the organization: Chairman, Professor W. S. Allen, Professor of Comparative Philology, University of Cambridge; Secretary, Mr J. S. L. Gilmour, Director of the University Botanic Garden, Cambridge; Treasurer, Mr P. H. A. Sneath, National Institute for Medical Research, Mill Hill. An annual subscription of about 10s is contemplated. Persons interested in joining are invited to write to the Secretary of the Society, from whom further details may be obtained.

Information on Standards

Members will remember that in June 1962 an inquiry was made by the British Standards Institution as to the problems of obtaining non-national, particularly foreign, standards. The answers to this have been most helpful and the following brief description might bring members up to date with the work of BSI in providing information on standards.

New and revised British Standards and amendments as they are published, draft British Standards, and new publications and drafts issued by the international organizations are listed in the monthly *BSI News*. A monthly supplement, available on request, lists the national standards of overseas countries received by BSI and available for reference in its library.

The library also collects information on standards other than national standards, such as Government specifications or railway specifications. It is unable to hold copies of the whole range of non-national standards, but tries to obtain these for members of BSI who need them, or directs them to the appropriate source or reference. It maintains a file of translations into English, both official ones issued by national standards bodies and unofficial ones prepared, for example, by firms.

Any organization which would be prepared to supply copies of its own translations of foreign standards to BSI or to offer its name as a source would be

rendering a service in the general interest and saving duplication of effort. Suggestions from industry as to ways of bettering information on standards would also be useful. Full details of membership of the BSI and its services may be obtained from the British Standards Institution, British Standards House, 2 Park Street, London W1.

Information Services and Management

• An article by Sir Harold Roxbee Cox (Chairman) and J. S. Rippon (Scientific Information Officer), of the Metal Box Company, on the value of information services to industry will be published as the lead article and cover feature of the November issue of the *Manager*. The article should have national press coverage and is the first step in a national campaign to convince management of the value of information services. It will be followed in November by a booklet, *Can you manage without information*.

Many efforts in this direction have been made by librarians and information officers over a number of years, but often with limited success. The article, booklet and the press cuttings should, if widely publicized and distributed, help promote a campaign, the success of which is of vital importance to British industry. They should also help information units which are having difficulty in convincing management of the value of their services.

Copies of the *Manager* will be available from Management Publications Limited, British Institute of Management, 80 Fetter Lane, London EC4, price 3s 6d a copy. *Can you manage without information* will be available from Aslib, from the British Institute of Management and also from other organizations, and the price will be approximately 5s a copy.

Modern Instrumentation in Science and Industry

The London Sections of the Institute of Biology, the Institute of Physics and Physical Society, and the Royal Institute of Chemistry will hold a one-day symposium on modern instrumentation in science and industry, on Friday 17th January 1964. The symposium will take place at the Institution of Electrical Engineers, Savoy Place, London WC2, from 9.15 a.m. to 5 p.m. It is the latest of a series of joint symposia held by the London members of the three institutes; the Chairman will be Sir John Cockroft, O.M., K.C.B., C.B.E., F.R.S., and the speakers will include Dr G. Malcolm Dyson, F.R.I.C., M.I.CHEM.E., Research Director of the Chemical Abstracts Service, on the 'Correlation of chemical, physical and biological properties of substances by mechanized programmes'.

The registration fee, which will cover the cost of light refreshments during the morning and afternoon sessions and of preprints, will be 20s for members of the participating societies, and 60s for non-members. Application for tickets should be made to the Finance Officer, Royal Institute of Chemistry, 30 Russell Square, London WC1.

Documentation of New Economic Activities in Britain and the Common Market

The High Authority of the European Coal and Steel Community has initiated a documentation service, in published form, entitled *Arrangements to facilitate the*

establishment of new economic activities: legal and financial arrangements in force in the member states of the Community and the United Kingdom. This is an English translation of a compendium published in 1959 and now brought up to date. It is in looseleaf form and will be kept up to date by amendments. The service gives particulars of existing Government legislation and other official arrangements for the encouragement of new employment opportunities, both in areas where traditional local industries are in decline and in the underdeveloped parts of the countries covered. The information is presented in the form of monographs, each by a senior official of the country concerned and arranged under the same headings for ease of comparison.

There is no charge for the service nor for postage. Inquiries should be made direct to Service de Documentation, Haute Autorité, 2 Place de Metz, Luxembourg.

Notes on Co-ordinate Indexing

J.L. Jolley and Partners Limited have decided to make a number of their *Notes on indexing* more freely available. These Notes are mainly designed to help those who are concerned with punched feature card ('peek-a-boo') systems, but many of them are useful in other fields of indexing.

The first two Notes concern 'Logical operators for feature card systems' and 'Combination digraphs and trigraphs for subcodes'. The former deals with the answering of questions according to their logical structure, giving standard stacking orders and details of the uses of transparencies. The latter provides instructions for making combination subcodes and includes tables of capacities, complete sets of digraphs and trigraphs, conversion table, and sets of random letters and numbers.

Later Notes are to deal with scanning procedures, accuracy checks, the pattern of meaning, the treatment of crossovers ('false drops') and with various statistical applications. Inquiries for the Notes should be made direct to 46-48 Frogmoor, High Wycombe, Buckinghamshire. The prices are: 'Logical operators', 10s 6d; 'Digraphs and trigraphs', 1 guinea.

Microreproduction—production and costing factors

A booklet with this title has been produced by Caps Consultants Limited for the information of engineering firms who already microfilm drawings or documents, or who are considering the installation of a microfilm system. Although written with the operation of the Caps-Jeffree 35 mm. variable-size ultra-violet projection microfilm enlarger in mind, this time and method study will be of interest to anyone concerned with microreproduction problems. Copies of the booklet are available from Caps Consultants Ltd, 10-12 Carlisle Street, London W1.

Document Reproduction Courses

The Hatfield College of Technology is arranging a series of short courses in document reproduction, designed to provide an opportunity for the study of the various processes and their application. There will be access to the College

documentation reproduction laboratory which is fully equipped for demonstrating the major processes. The dates of courses for the coming session are: for senior librarians and information officers, 11th-15th November 1963 and 9th-13th March 1964; for office executives, 2nd-6th December and 4th-8th May. The lecturers will be Mr G. H. Wright and Mr S. B. Page.

The College also runs the Reprographic Technology Study Group which meets at least once a term, to discuss new processes or problems; the fee for membership is 30s. The course fee, including coffee, lunch and tea each day, is £5, and hotel accommodation can be reserved on request. Further details and application forms may be obtained from the County Technical Librarian, Hatfield College of Technology, Roe Green, Hatfield, Hertfordshire.

British Technology Index

The first annual cumulation of this publication is now available. Following the format of its monthly parts, it lists under subject headings in a single alphabetical sequence about 28,000 entries for technical articles in four hundred British journals. The subject coverage embraces all departments of engineering and chemical technology, together with the various manufacturing processes based upon them; it also includes a great deal of material on the pure science of man-made objects and industrial processes, although the main emphasis is on applied science. The applied biological sciences are excluded. This 1962 cumulation will have been received by subscribers to the full service of the BTI, but may be obtained as a separate volume from the Library Association, Chaucer House, Malet Place, London WC1, price 9 guineas.

World List of Scientific Periodicals

The first of three volumes comprising the fourth edition of this work is announced for December 1963. More than twenty thousand titles have been added since the last edition. A special pre-publication price of £21 for the set is offered for orders received by 30th November; after 1st December the price will be £25. The *World list* is being published by Butterworths, from whom further information may be obtained. Publication is expected to be completed early in 1964.

Scientific Reprints

A request has been received through the British Council for a suitable depository for about two hundred reprints of scientific papers. The papers, mostly signed by their authors, have been left by the late Dr Paul Rosbaud, whose executor would like to know of a library or suitable organization that would be glad to have the collection. All the sciences are represented, although physics predominates; the papers are in English, German, and (a few) in other languages. They are of research, not technological, level, and are reprinted from research journals and journals of learned societies. They will be given away as a collection only, not separately.

Anyone who is interested or would like further details is asked to get in touch with Mrs C. M. Kendall, 7 Ashley Gardens, Westminster, SW1.

Guide to Sources for the History of Latin America

The International Council on Archives is sponsoring, as one of a series, a *Guide to sources for the history of Latin America*. The *Guide* is now in the course of preparation, under the direction of a Committee composed of Sir David Evans, formerly Keeper of the Public Records, Sir Robert Somerville, Clerk and Keeper of the Records of the Duchy of Lancaster, Professor R. A. Humphreys of University College, London, and Mr P. Walne, County Archivist of Hertfordshire. The *Guide* will survey, as comprehensively as possible, all relevant business records. Much of the economic history of British interest in Latin America has still to be written, and it is hoped that business archives may provide material of absorbing interest for its completion.

If any firms or organizations have any material of any kind relating to commercial, financial or manufacturing operations in Latin America before 1939, the Committee would welcome either a brief report or the opportunity to examine the material with a view to reporting on it in the *Guide*. Nothing would be published without the full agreement of the organization concerned. Any queries, reports or communications should be addressed to Dr D. C. M. Platt, Department of History, the University of Exeter, Devon, who is acting on the Committee's behalf.

NEW MEMBERS

CORPORATE

<i>Name</i>	<i>Locality</i>	<i>Representative</i>
Alfa Romeo (G.B.) Ltd	London	A. Lloyd Bonett
Amoco (U.K.) Exploration Co.	London	I. Macartney
Barbour Index Ltd	London	Miss A. Tyszkiewicz
Beddington and Wallington Public Library	Wallington	W. J. Hill
Centre Technique des Industries de la Fonderie	France	Mlle Rosenfeld
Clifford Culpin & Partners	London	R. G. Robertson
Coats Ltd, J. & P.	Scotland	A. E. Beety
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Vernon, C. & Sons Ltd	London	R. Cooper
Wallop Industries Ltd	Stockbridge (Hants)	B. S. Coward

INDIVIDUAL

<i>Name</i>	<i>Locality</i>
Barrington, J. S.	Eire
Barry, M. A.	Stevenage
Cavanagh, J. M. A.	Netherlands
Fleisher, Mrs M.	London
Fowler, Mrs M. P.	Sidcup
Hoare, R. A.	London
Humpage, Miss C.	Woking
Laidlaw, Miss M.	Macclesfield
MacLennan, Dr J. M.	London
Oberman, Miss Sheila T.	London
Odom, Miss S.	Sheffield
Petherick, Mrs K.	London
Searl, G. B.	London
Takle, Miss K. G.	U.S.A.
Tims, Mrs S. R.	Guildford

MAKING YOUR OWN INDEXING SYSTEM IN SCIENCE AND TECHNOLOGY (CLASSIFICATION AND KEYWORD SYSTEMS)

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Based on a paper read to the Aslib Chemical Group, London, 19th March 1963

INTRODUCTION

IN visiting more than a hundred special libraries and information units in Britain (not to use their resources but to study their methods) I have often been concerned by the inadequacy of the private indexing systems in use, although there were many exceptions. The classifications were often crude, and/or outdated, and/or quite insufficiently detailed, and were seldom provided with good subject indexes. Alphabetical subject-heading indexes are more difficult to assess on a brief visit, but these were seldom detailed enough, so that fifty or more documents could be indexed under one heading. Seldom was there a separate subject-headings list, and often no recognition of the need of one. Guidance for the user was very often poor.

Most of these deficiencies were the result of understaffing, but they were sometimes partly due to lack of training and experience. Staffing has improved and is improving, but the labour of making one's own indexing system in adequate detail must not be underestimated. It takes some hundreds of hours to make a detailed faceted classification, and the maker(s) must be expert in classification and well-informed on the subjects to be covered. Keyword systems can be started more easily, but time will be needed later to control synonyms and near-synonyms. Nevertheless I believe that a special library or information unit is more efficient if it has its own indexing system based on its own circumstances and needs, and that a ready-made system, like a ready-made suit, is in general less satisfactory than the article built for the job.

Systems I have seen, based on standard classifications or subject-heading lists, are by no means immune to criticism. A ready-made system is always out of date to some extent, and most of the standard general classifications are based on the structure of knowledge as it was up to ninety years ago.

Staffing of special libraries and information units which are expected to grow to a reasonable size (a staff of over six, say) should be more generous in their early stages than is strictly needed for their day-to-day working, so that the necessary effort is available to build a sound indexing system. If this has to be done in odd moments snatched from other work, efficiency may suffer for a long time.

This paper is concerned with the mental activities of system-making, and,

except for minor observations, not with the process of indexing or the physical form of indexes.

• TERMINOLOGY OF INDEXING IN GENERAL

The collection of symbols under which a document is indexed for any one concept will be called a *descriptor*. It may be a word or words, or a classificatory notation. (I realize that Mooers,¹ who coined this term, uses it in a somewhat different sense, but I know of no other term covering both words and notations.)

• The set of descriptors used or usable in an index is termed a *descriptor language*.

Indexes are of two basic types. In the *pre-co-ordinate* or traditional type, the descriptors representing a *compound subject* (one comprising two or more concepts) are co-ordinated or linked at the time of making the index entry. The entry normally represents a document, bears its bibliographical details, and often carries all the descriptors used for the document, with one marked as the descriptor by which that entry is filed; this is *item entry*. In a *post-co-ordinate* index, however, the descriptors are only co-ordinated at the time of search. The entries are normally *descriptor entries*, also called *term entries*, and each entry stands for a descriptor and carries identifications (usually acquisition numbers) of all the documents indexed by that descriptor. The addition of identifications of new documents to the descriptor entries is called *posting*. It is necessary to have a file with one entry per document giving bibliographical details, the entries being filed by the same identifications as are used for posting. This file I call a *shelf-list*.

The symbols showing the whereabouts of a document in the library or store are called its *address*.

Exhaustiveness of indexing can be simply stated as the average number of concepts indexed per document. *Exhaustiveness of searching* depends on the number of search programmes tried before search is abandoned, and this of course depends on the definition of a search. *Specificity of indexing* is the degree to which descriptors match the specificity of the concepts indexed. If all organic compounds of mercury, however disparate, are indexed only under a descriptor meaning 'organic mercury compounds', the indexing is not very specific. *Specificity of searching* is the specificity of the descriptors used in a search, relative to the concepts on which information is sought; specific searching is of course only possible so far as indexing is specific. The statement of these four concepts in this form is due to Cleverdon.^{2, 3}

OPERATIONS IN COMPILING AND USING AN INDEX

There are three operations in making index entries and three in using an index. 1. 'Concept indexing' is deciding on the concepts in the document, and on which to index. With pre-co-ordinate indexing it includes deciding how to combine descriptors and perhaps showing the relations between them. Concept indexing is, and will probably always be, an intellectual process. 2. The concepts now have to be translated into descriptors. Cleverdon,² p. 97, maintains that this 'is, or should be, a purely clerical process'. It is so, surely, only if the clerical worker is given a highly developed dictionary for the conversion, which very rarely happens. 3. The decisions reached have to be incorporated in the

physical index; this is obviously clerical work. 4. In using the index to satisfy an inquirer, his question must be analysed into its individual concepts and their inter-relations, and a search programme formulated. 5. The programme must be translated into descriptors, and 6. the index consulted to produce the addresses of documents likely to be useful. The evaluation of these documents before passing a selection or a summary of them to the inquirer is a seventh process, usual in more advanced work, but not confined to the use of an index.

RELEVANCE AND RECALL

We owe to Cleverdon,² p. 71-2, 89, 105, the introduction of these important ideas:³

$$\text{Recall ratio} = \frac{100R}{C}$$

$$\text{Relevance ratio} = \frac{100R}{L}$$

where C = the total number of documents *with a given standard of relevance* to a given question,

R = the total number of *those* documents retrieved in a search based on that question, and

L = the total number of documents retrieved in that search.

Clearly these ratios will vary, perhaps widely, from question to question, and we shall be more interested in average ratios. An uncertainty is introduced by the very great difficulty of defining standards of relevance.

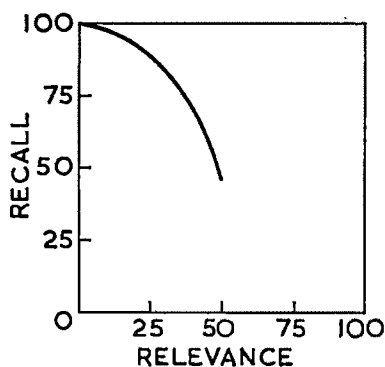


FIGURE 1

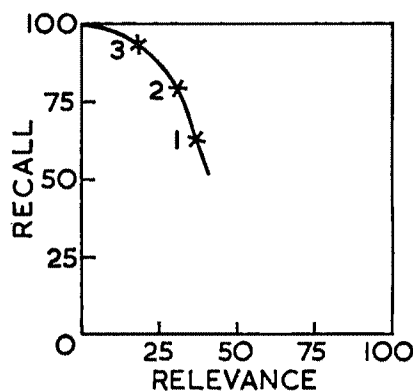


FIGURE 2

Relevance ratio and recall ratio are linked very roughly as shown in Figure 1, which represents an estimate of 'the maximum retrieval performance' in the subjects covered by the Aslib-Cranfield tests.³ Figure 2 shows the effect of three descriptor languages of decreasing specificity in the order 1, 2, 3. With the least specific language 3, specificity both of indexing and searching is low, and we have high recall and low relevance. With language 1 these specificities can be high, and we have lower recall and higher relevance. Examples of such languages would be the Universal Decimal Classification with a maximum use of nine, six, and three digits respectively. *High recall appears to be associated with low*

relevance, and vice versa, in the use of an index. Relevance to the user can be improved by evaluation and selection of documents after retrieval. Where this is regularly done recall seems the more important.

RESULTS OF THE ASLIB-CRANFIELD TESTS

These tests^{2, 4, 5} were to some extent artificial, as was freely admitted. Success in the main test depended on finding the 'source document' by which the question had been suggested. Finding other equally or more useful documents counted as failure. Search on a single concept was not allowed, and of the concepts in an initial search programme only one could be dropped. Even so, the results are the only useful ones we have for the comparison of descriptor-language efficiencies. Some selected results are as follows:²

	<i>Efficiency %</i>			
	<i>UDC</i>	<i>Alphabetical subject headings</i>	<i>Faceted classification</i>	<i>Uniterm</i>
Results of all searches	75.6 Standard	81.5 error 2.6%	73.8	82
Result of a small test with the facet nota- tions permuted as in UDC	No standard error given			
Third round of searches (procedures standardized for all systems) by project staff	76.1 Standard	84.5 error '5% approx.'	79.3	87.3
Searches by technical (non-librarian) searchers	79.6 Standard	73.3 error 3.2-4.1 %	66.7	81.1
Searches by project staff, excluding questions where source document was found by all four systems (i.e. easy questions?)	54 No standard error given	58	43	63

FIGURE 3

ALTERNATIVE INDEXING SYSTEMS

The following diagram shows a double classification of various indexing systems:

<i>Kind of descriptor</i>		
	<i>Classification symbols</i>	<i>Words</i>
Pre-co-ordinate (traditional)	* 'Tree of knowledge' (main division into disciplines) * Faceted, with fixed combination order of facets † Faceted, with no combination order, but permutation as for UDC	Alphabetical subjects headings
Post-co-ordinate	† Post-co-ordinated facet systems	Keyword or Uniterm

FIGURE 4

Only the systems asterisked can *by themselves* provide a subject filing order for documents. The systems marked with a dagger can provide an order for single concepts, but not for compound subjects, such as most documents represent. They can be used in conjunction with such a filing order, but it may mean an extra step in getting from the index to documents. With post-co-ordinate systems, it is usual to list the documents indexed by a given descriptor on the entry for that descriptor by their acquisition numbers. Any other method introduces considerable difficulties of layout. If such a system is used with a subject filing order for documents (say a 'tree of knowledge' classification) the user must, after using the index, go to a file where he converts the acquisition numbers into the addresses of the documents. This extra trouble is not likely to be acceptable.

The classification systems listed third and fourth in order are new, there is little literature on them, and there are very few people with practical experience of them, nor can I claim any. The permuted facet type was used in a small test in the Aslib-Cranfield Project, as already mentioned (Cleverdon,² p. 59-60). A post-co-ordinated facet system was used by Rosser.⁶

CLASSIFICATION SCHEMES

In general I prefer the classification method for the service of people educated up to its use, and where a satisfactory classification can be made, but it has its disadvantages. Some subjects do not classify well; examples are chemical, and

especially organic, compounds by composition, hormones by effect, enzymes and prepared foods. This is usually due to one of two reasons: *i*, it is difficult to set up mutually exclusive classes, and *ii*, the order in which characteristics of division should be applied is not clear. The first of these difficulties applies especially to prepared foods. The usual method is by main ingredient, but foods often contain two or more in similar proportions. Classification by type of dish is still more difficult; terms like 'puddings', 'pies' and 'stews' are hopelessly vague. The same difficulty applies to hormones; since each hormone acts on a variety of body systems and organs, it is not possible to classify hormones into those acting on, for example, the respiratory or circulatory systems, if individual hormones are to be placed unambiguously in the framework. They can of course be separately classified by composition, and individual hormones placed only in this grouping.

With chemical compounds, the other difficulty enters. Sometimes we want all diphenoxy compounds, sometimes all δ -hydroxy- β -ketonic acids (whether aliphatic, aromatic or heterocyclic), sometimes all compounds containing arsenic and nitrogen. In other words there is no generally satisfactory way of classifying organic compounds. Inorganic compounds may be sought with a given anion, or cation, or other feature. The familiar classifications in Beilstein's *Handbuch der organischen Chemie* and similar works separate many closely related compounds, and a complete search for a group of compounds split by the classification is very time consuming. The only answer here is a system allowing multiple approaches in a combination selected at the time of search, i.e. a post-co-ordinate system, and there are many accounts of such systems, mostly with sequential scanning of mechanically sorted punched cards.

Classification systems also wear out. The shapes and relative importances of subjects, and their inter-relationships gradually change. New subjects constantly arise, mostly on the borderlines of old. Completely new relationships arise, such as that between electrochemistry and production engineering, based on new methods of electrophoretic coating, developed in recent years.

A classification once fixed for indexing can absorb these changes well or ill, according to the skill of its design and notation, and remain useful for a long or short time, but it wears out in the end. With modern notations, which are considered below, new subjects can be inserted anywhere, and also references for new relationships. What cannot be done is to adapt the classification to new syntheses, such as cybernetics, and sweeping changes in the nature of a subject.

'Tree-of-knowledge' classifications, because based on disciplines, appear to wear out faster than faceted schemes; this may merely be because we have known them longer.

Ranganathan has suggested an answer, in his unfortunately named 'method of osmosis'. This is to make a new classification at intervals, reclassify only such material as is still of importance, and leave the remainder under the older scheme. This seems useful only for libraries which retain much obsolete or obsolescent material; few special libraries in science or technology do this. The 'intervals' in these subjects seem likely to be at most thirty years, and may well decrease. The labour is beyond the resources of most of us.

Another well-known difficulty of classification is that different experts want

subjects classified in different ways; and in large organizations, with varying views among the staff, a special classification must be rather a compromise.

I have dwelt on the disadvantages of classification, because I think that they have been rather minimized in the literature. The advantages are better known: *i.* the 'bird's-eye-view', which can be so helpful to the reader and the staff, is built in; *ii.* it is easy to broaden or narrow search programmes; *iii.* documents may be arranged in a more or less helpful order; *iv.* weaknesses in the classified holdings are revealed.

Most modern classifications are of the faceted type, in which the primary division is not by disciplines, but into logically separable 'facets' or categories. A set of facets which works reasonably well for science and technology is as follows:

- a. Things* (tangible objects such as machines, plant, apparatus).
 - b. Parts of things* (components, which can often form part of many different *Things*).
 - c. Substances*, distinguished from *Things* by lacking a significant form. A gramophone record is a *Thing*, whereas the vinyl plastic or other substance from which it is made is not. If the substance has a form, such as flakes or powder, it is not normally significant.
- Processes are conveniently divided into
- d. Operations* carried out by man, and other processes which occur naturally but may be controlled by man. Distillation is an operation in this sense; evaporation is not. The other processes are so closely associated with properties and phenomena as to be best combined with them.
 - e. Processes, properties and phenomena.* A property is often the ability or inability to undergo a process, as with corrodibility. Processes tend to be considered phenomena when first discovered.
 - f. Space* and
 - g. Time* call for little comment.
 - b. Common subdivisions* comprise *i.* subjects which, in the special context, are important less for themselves than as associated with other subjects, such as societies, law and statistics, and *ii.* forms of documents, as bibliographies, standards and theses.

If management is included in the field, a facet for *People* will be necessary. This will include corporate bodies (associations, companies, etc.) and groups of these; people collected together for a special purpose (meetings, conferences); professions and vocations; and groups defined by other activities, such as users of a company's or an industry's products. If management is excluded, some of these concepts will still be required, but can be placed in the common subdivisions.

If biology is included, it will be desirable to have separate facets for *Organisms* and *Parts of organisms*, though they can be regarded as *Things*.

Such a classification is easier to make and use than one based on disciplines, and allows far more easily the classification of compound subjects. Its use is rather like that of a Meccano set. In a pre-co-ordinate index, notations for single concepts are assembled into a class-mark representing the compound subject of the document. Used post-co-ordinately, each single concept is indexed by its

notation, and the entries compared at the time of search for common postings. Such a classification conforms to Vickery's definition (reference ⁷, p. 31): 'An orderly arrangement of terms developed by logical division of a subject by means of a train of characteristics'. It does however separate some closely related ideas which are kept together in a 'tree-of-knowledge' classification. All operations are separated from the materials and from the plant used in them, as painting from paint and painting equipment. However, equipment used only for a given operation could be subordinated to that operation. The difficulty is in consistency, and changes of practice.

It has hitherto been the practice to employ a fixed order of facets. Supposing this to be the order given above, a compound subject, such as the toxicity of tetra-ethyl lead for rats, receives a single entry in the classified catalogue under a class-mark representing Rats (things/organisms): Tetra-ethyl lead (substance): Toxicity (property). In the alphabetical or 'chain' index are entries for:

Toxicity: Tetra-ethyl lead: Rats *see* XYZ

Tetra-ethyl lead: Rats *see* XY

Rats *see* X

so that all the component ideas are indexed, with the minimum of labour, if not in all permutations, which is hardly practicable.

The Cranfield test has thrown grave doubts on the efficiency of such systems for specific indexing, and the report (reference ², p. 91) explicitly states: 'Its [i.e. the faceted classification's] weakness undoubtedly lay in the insistence on the use of a fixed order combined with chain indexing'. For a subject such as toxicity in a large index there might well be hundreds of references to a hundred or so different notations in the classified index, and the searcher simply gives up. Even the chain-index entries for toxicity of tetra-ethyl lead may refer one to a dozen or more places.

There is also the weakness in arrangement of material. It sounds logical to subordinate operations to the materials they are employed on, as in the English Electric Co. Ltd scheme,⁸ but this means that a book on the welding of aluminium is shelved with books on aluminium. The main subject, however, is welding, as modified by the material used. I am doubtful as to the possibility of finding a facet order which will not produce these unfortunate results.

It is possible, of course, to have a system which is pre-co-ordinate for filing documents and post-co-ordinate for indexing. The complete class-mark would be synthesized at the time of indexing, and used for filing the document, but it would, so to speak, be taken to pieces again for indexing, and the document indexed under the component descriptors, which would only be combined at the time of search. This avoids chain indexing, but leaves the difficulties of arrangement discussed in the last paragraph. I know of no example of such a system. The user would have to understand, or be taught, the combination of descriptors according to the fixed facet order, in order to produce the class-mark or address where the document was to be found.

From the Cranfield results given above can be seen the marked improvement in efficiency obtained when, in a small test, the facets were permuted as for UDC. Such a system is completely pre-co-ordinate, but instead of there being normally a single entry in the classified sequence, there are several entries, the

components of the class-mark being permuted, so that all the strain is not put on the alphabetical index. No rules for this permutation are given. The theoretical number of permutations for a four-concept subject is twenty-four, and for a five-concept subject 120. It is usually enough to permute by 'rotating', for instance if we have four co-ordinated descriptors A, B, C and D, the permutations would be ABCD, BCDA, CDAB and DABC. If one of these concepts were of especial importance to the organization served, if for example it were a product of the firm, it would probably be worth while to show it directly linked to each of the other concepts: taking A as the especially important concept, one would have, besides ABCD already given, ACBD and ADBC. To enter more permutations than this, except for very important material, is of doubtful economic value. In the classification of indexing systems given above, it is assumed for brevity that there is no combination order of facets with this type of system, and the remark about providing a filing order only for single concepts is then true. There can of course be a combination order, not for the index, but solely for producing class-marks for filing documents, as with the last system discussed, and then the remark ceases to be true; we are still left with the difficulty found with the English Electric classification, that the combination order sometimes shelves documents in the wrong places.

It seems to me that from an indexing point of view, there is much to be said for using a faceted classification in an entirely post-co-ordinate way, and suggestions are given later in this paper on a method of doing this.

In making a faceted classification the first task is to define the field to be covered, and decide what marginal subjects are to be included. Subjects likely to be seldom needed can be drawn from a general classification, but trouble always crops up over the dividing line between special and general classification, and it is better to include all subjects of predictable importance in the special scheme. It is impossible in a paper of this length to deal with every difficulty which may be met. Many are covered in Vickery's books,^{9, 10} which should be studied; they do, however, assume the fixed-facet-order plan.

Subjects can be taken from one's own head (which is best where possible), from textbooks, and from indexes to periodicals and abstracts. Their analysis and sorting into facets, such as those given above, is mostly quite easy with a little practice. (A demonstration of this was given during the reading of my paper to the Aslib Chemical Group.) Difficult subjects will be met, and are helpful in clarifying one's conception of the facets. Is a bubble, or a flame, for instance, a thing or a phenomenon? I consider a bubble a thing, because it is tangible if often impermanent, and a flame a phenomenon. Others will have other views. Structured materials such as wood are properly parts of things, but might be better combined with substances in a *Materials* facet, especially in an engineering classification. Blood is properly a tissue, but because it is conveniently placed close to plasmas and sera, it too may be treated as a substance, with the necessary reference from the schedule for parts and tissues of the body. One should depart from logical classification only rarely and for good and permanent reasons.

Arrangement of subjects within facets is much more clear-cut in some facets than in others. For two facets some dependence on disciplines is inevitable.

For things (here including substances) the 'theory of integrative levels' proposed by Feibleman¹¹ is of some help. Briefly, it proposed a series of levels of existence, such that a combination of units from one level forms a unit in a new, more complex level, the members of which are quite unlike the members of the lower level. The series of levels runs, with some forkings, from fundamental particles through atoms, molecules and masses (all these being included in the substances facet as defined above) and thence *a*, through terrestrial masses, physiographical features, to the earth, the solar system, constellations and galaxies, and *b*, through non-cellular self-reproducing matter, through parts of cells, cells, tissues, organs and organisms to man. From man other series of levels diverge: his artefacts, his ideas, and groupings of men.

Normally a faceted classification will be concerned with very few of these things, and often a simpler basis of classification will suggest itself. In the English Electric classification,⁸ which is one of the very few published in full, 'Machines and systems' (i.e. things) are divided into *a*, Electrical systems and machines, *b*, Telecommunication systems and plant, *c*, Mechanical and thermal plant, and *d*, Transport systems and machines. There is also a facet for ancillary plant and components.

With organisms we have outside help from the taxonomists, but their published classifications differ more than is often realized, and are constantly changing. Different taxonomists prefer different characteristics as bases of division, or use them in different sequences. The four widely used classifications of flowering plants differ considerably in the number of families and in their grouping into orders and classes. One can only adopt a recent classification, knowing that, like all classifications, it will become out-dated, and that there will at times be great difficulty in fitting into it groupings of organisms taken from other systems. On the subject of man, we can get help from social science classifications such as the Kyle classification.¹²

Substances should be divided first by composition, with placings for all compounds of known chemical structure. Other subfacets will be divided according to activity (use), and phase (solutions, gases, etc.), and further subfacets may be required for substances not classifiable by any of these, such as extracts and plant saps. Cross-classification of substances is especially troublesome. It will be best as a rule to limit subfacets other than composition to groups of substances, and to individual substances whose exact constitution is not known. One alternative is to place specific substances in every class they belong to, e.g. to classify ergosterol as a sterol, a provitamin, a plant constituent, a phenanthrene derivative, and so on. This creates great problems of cost, consistency and bulk of index. A third, and very expensive solution, is to index organic compounds, at least, by every hydrocarbon ring or chain, every substituted position, and every substituent. If it is necessary to find if the index contains information on any compound satisfying certain requirements, for example one containing two naphthalene nuclei linked in the 1 : 1 position by a secondary amino-group, with a nitro-group at position 3 on one naphthalene nucleus, and a bromo-group at position 7 on the other, then this method must be adopted.

It will be necessary to provide for many groups of substances referred to in

literature, such as sulphates, antibiotics, organic sulphur compounds, elements of periodic group III, fatty oils, steroids, alkaloids, gums, mineral acids, and so on.

It is extremely difficult to classify operations except by disciplines. They are, after all, the active components of disciplines, and for some subjects, such as chemical or production engineering, they are easily the most important facet. Their classification will also at times involve the things or substances with or on which they are carried out. It is, for example, very difficult to make a schedule for production engineering which will work equally well for metals, plastics or wood, and it is much easier (and usual in practice) to have different subdivisions of production engineering according to the material used. These are known as 'differential' facets or schedules. There is the difficulty that many compound subjects have their own subdivisions; a good example is 'welding of plastics' and the subdivisions of this are so different from those of 'welding of metals' that, as for production engineering, of which welding is a part, it is extremely difficult to provide a schedule of subdivisions of welding which will be satisfactory with both materials. In strict facet theory, a compound subject is shown as the combination of its parts. If 'welding of plastics' is always shown as a combination of 'welding' and 'plastics', there is no proper place in the schedule for its subdivisions.

The answer is to combine as shown in the last sentence, but to have a differential schedule of subdivisions for welding when combined with plastics (or a plastic), and another for welding combined with metals (or a metal). If a document deals with both it must be classified for both. No confusion should be possible between the notations of the two differential schedules.

Processes, properties and phenomena are also commonly divided by disciplines, for example into physical (heat, light, sound, electricity, etc.), chemical, mechanical, and so on. It is very difficult to find any other helpful order.

The subdivision of space need not concern us here, though the classification of geographical areas has its own complexities. Many special classifications use the geographical schedule from a general classification, such as UDC. As to time, few scientific or technical information units are closely concerned with history, and a very simple division suffices; it should however provide for 'the future'—a frequent omission.

It will be clear from the above that although disciplines are no longer our main characteristic of division, they are still an important one in some facets. Disciplines themselves will occur as subjects, and do not fit easily into a faceted scheme. A paper on the 'Chemistry of veratrine alkaloids' will deal with their structures and reactions, and can be so indexed, but disciplines cannot be entirely avoided as descriptors, and there are two ways of dealing with them, neither wholly satisfactory. The English Electric classification⁸ inserts physics and chemistry in the facet for Phenomena and properties (which is divided first by disciplines) and mathematics in the Operations facet. This separates physics and chemistry from their operations, things and substances. The alternative is a separate facet for disciplines, which will separate them from all their detailed content.

In classification the viewpoint of one's own organization can bring simplifications, but if these are not based on logic they can be dangerous. For example, in the company I serve, wood-working is largely confined to making models of car-body and similar surfaces, and patterns from which castings for press-dies are made and machined. Two years ago it would have been convenient to subordinate wood-working to the making of models and patterns, but it is now probable that most of these will before long be made, not of wood, but of plastic and other materials.

- The importance of notation in classification has been greatly exaggerated, and discussions of it have at times tended to dwarf classification itself. Notation is simply a device for putting and keeping subjects in a desired order. Whether it should be alphabetical or numerical, mixed or pure, is, in the absence of research on the question, a matter of personal preference. A 'non-hierarchical' notation, one in which the divisions of the notation do not necessarily correspond to divisions of the subject, is normally shorter than a hierarchical notation, and allows easier insertion of new subjects.¹³ If 1 or A is never allowed as a final symbol, it can be used to insert any number of new subjects: between M and MB one can insert MAB/MAY, and later if necessary MAAB/MAAY. Between MP and MQ can similarly be inserted MPAB/MPAY, MPAAB/MPAAY. Z or 9 can be left for residual minor subjects, and subdivided later.

The catalogue or index of a post-co-ordinate classified system will consist of records arranged in as many classified sequences as there are facets, with a common alphabetical (word) index. No facet will be subordinated to any other, so that there will be no 'distributed relatives' as in a fixed-facet-order scheme. It will be possible to find all information on, say, toxicity in one place, but its relations with other subjects will have to be found by comparing posted numbers, or, better, by the use of superimposable or 'feature' type punched cards.¹⁴

For example, the subject 'removal of sulphur fumes by lead dioxide in the determination of carbon in iron and steel' could have entries as follows (the notations would have to be imaginary ones and are not given):

- Operations: 1. Chemical analysis
 2. Removal of interfering substances
- Substances: 1. Ferrous metals
 2. Lead dioxide
 3. Carbon
 4. Sulphur dioxide

The user would find in the alphabetical index the descriptors of the compound subject (whether he looks under Ferrous metals, or Iron, or Steel he would be referred to the appropriate descriptor), find the records for these descriptors in the classified sequences, find the common numbers, and then go either to the shelf-list or the documents themselves.

In a post-co-ordinate system it is not possible to have relations between terms, except as descriptors ranking equally with others. The descriptors for the above subject cannot show that 'lead oxide is used to remove sulphur dioxide in the determination of carbon', because the descriptors are on separate records which index other documents beside this one, and the relations between

them vary from document to document. There is therefore a possibility of false co-ordinations, or (in the language of edge-notched punched cards) 'false drops'. The above document would be retrieved by anyone seeking information on the use of carbon to remove lead oxide in the determination of sulphur dioxide in ferrous metals. Fortunately, a high proportion of the possible false co-ordinations are, like this one, technically nonsensical, so that nobody is likely to search for them. The question of false co-ordinations is also considered in the discussion of keyword systems, and the methods, such as 'roles' and 'links', developed for minimizing this difficulty with keyword systems are equally applicable to post-co-ordinate facet indexes. Relations which frequently occur in scientific and technical literature, such as Comparison and Effect (of X on Y) can be used as separate descriptors, but again, false co-ordinations of these with other descriptors will be possible. This seems to be an inescapable drawback of post-co-ordinate indexes.

I have discussed one particular form of faceted classification which seems to me the most useful for pure indexing (as opposed to subject arrangement of material), because to my knowledge nobody else has done so. I must make it clear that these ideas are not based on any practical experience, and are put forward with some diffidence. I hope that, at least, they may stimulate others to think about, and try this method, and give us the benefit of their experience. If I have not discussed non-faceted classifications in any detail, it is because so many others have done so. I think that for subject arrangement of books which do not provide great detail, they are still useful, and permit the bringing together of closely related subjects, such as paint, painting, and painting equipment, which a faceted classification separates.

ALPHABETICAL SUBJECT INDEXING

I do not deal with this because I have no practical experience of it at all, and there is a recent and very good book on the subject.¹⁵ The Cranfield test results were good.

'KEYWORD' INDEXING

This is based on the Uniterm system introduced by Taube in 1953.¹⁶ As first proposed it had at least one important weakness. No adequate method was given for controlling the admission of new Uniterms, nor was there any clear recognition of the need for such control. Nevertheless, the basic idea was sound, to use single words as descriptors, and to avoid subdivisions and subordination of one term to another, except in carefully defined cases. Instead, terms are post-co-ordinated at the time of search.

Much work has been done with Uniterm in the United States, but very few American writers on the subject seem to have developed rigorous methods of controlling synonyms and near-synonyms in admitting new Uniterms. Wadington¹⁷ appears to have done this, but gives inadequate details. The only method of doing this, short of comparing each proposed Uniterm with every Uniterm in use (an impractical task with hundreds or even thousands), is by classification. A suggested method is given later in this paper.

Homonyms are also a source of trouble. Some writers deliberately combine them. In Boyd's system, for example, 'Liners' can mean cylinder liners, ocean

liners, or line-ruling machines.¹⁸ 'Base' may include support, bad, servile, headquarters, fundamental, etc. This may serve where the index is used solely by the information staff, who understand its idiosyncracies. It is rarely possible or desirable to confine the use of an index in this way, and there is the danger that users of the information service would think very little of an index which confuses distinct ideas in this way, and consequently very little also of the information staff. The method does of course reduce the number of descriptors required, but this does not seem to me to compensate for having to index a 'big end' (the large end of a connecting rod) as 'High' and 'Last' because 'big' is referred to 'High' and 'end' to 'Last'.

It is assumed in what follows that a keyword system is based on a limited list of keywords, each representing (as far as possible) a single concept, that the relations between related concepts are made clear by scope notes and 'see also' references, and that ample links are provided by 'see' references between terms not chosen as keywords and the corresponding keywords. It is also assumed that homonyms are separated and characterized by explanatory comments, for example that Films (cinema), Films (photographic) and Films (thin layers) are separate keywords, and that new keywords are only admitted after considering their relations to existing keywords. In other words the Uniterm system is combined with good alphabetical subject-heading practice, so far as this is applicable. Because Uniterm is taken in Britain to mean inadequately controlled systems, I prefer the term 'keyword systems', but the debt to Taube remains, and might perhaps be more often expressed.

Keywords are normally single words, less often combinations of words. There is no subordination of keywords to each other; all are freely combinable. Single words are 'free terms'; combinations of words, such as 'Remote control' or 'Research and development' are 'bound terms'. In the Uniterm system as first proposed, if the first word of a bound term (e.g. 'Remote') is ever used by itself as a free term, it is said to free itself, and the old bound term must be scrapped and the postings copied on to separate records (e.g. 'Remote' and 'Control'). Half of this labour can be saved by using the old card with one word crossed off. Later experience has shown the need for some modifications of this rule in special circumstances.

Some authors^{19, 20} find that bound terms very often free themselves in the end, and prefer not to use bound terms at all. I do not agree with this. Some combinations of quite general and vague terms (themselves of very little use as keywords) have reasonably precise meanings, for example 'work study', 'materials handling' and 'operational research'. Research and development often cannot be consistently distinguished, and are better combined. Of course, the second and any later words of bound terms, when useful indexing words, should themselves be keywords, or be referred from.

Other authors advocate pre-co-ordination for very common combinations of terms.^{17, 21, 22} If one were dealing every day with literature on plastic bottles, it would be sensible and time-saving to have 'Plastic bottles' as a keyword, and references to it from 'Plastics' and 'Bottles'. However, a high degree of pre-co-ordination would undermine the system and lead back to alphabetical subject headings.

The combination or amalgamation of related concepts in one descriptor was termed by Fairthorne²³ 'confounding', which suggests that it is bad practice. It is frequently useful with keyword systems to combine forms of a word in one keyword, e.g. 'filters, filtering' or 'filters, -ing' and this has, following Fairthorne, become known as confounding. It is, of course, a blunting of the concept expressed, but often in science and technology a process implies the necessary equipment or material, and vice versa. One cannot filter without a filter, or solder without solder, and combination of verbal forms (as I prefer to call it) is a useful device. It will increase recall and decrease relevance, and should not be used where relevance is the more important.

The arrangement common with post-co-ordinate systems, of keeping documents under acquisition numbers, which are also used for posting on the keyword cards, is well known. A classified order of document storage is possible, but requires that the user should always consult the shelf-list, with which he converts the acquisition number into the address or class-mark for each document. He cannot go from the index direct to the documents. The shelf-list is useful when documents are out on loan. It may incorporate abstracts; it may also give for each document the keywords by which it has been indexed, or they may be in a private record. It is necessary to have a record of these so that postings can be deleted when a document is irreplaceably lost, or withdrawn. The indexer's original slips can be made to serve for this.

The keyword system has been attacked on the grounds that it produces false co-ordinations or 'false drops' as well as for other reasons.^{6, 24, 25} A document on 'Chromium plating compared with bright aluminium for motor-car trim' will have keywords: Chromium; Plating; Aluminium, etc., and will be found by anyone looking for information on aluminium plating, which is an improbable subject. A number of authors^{17, 18, 19, 20, 26} have stated that in practice false co-ordinations are no great problem. Documents retrieved are normally scanned by information staff before a selection, or a summary, is passed to the inquirer, and false co-ordinations can easily be eliminated at this stage. Their occasional occurrence can easily be explained to other users of the index, who in my experience greatly appreciate the simplicity and efficiency of a good keyword index.

There are two or three methods of eliminating or greatly reducing false co-ordinations. 'Links' show which subjects are related in the document, but not how they are linked.^{27, 28} For example, a document (number 2307) on the imports (iron, steel, etc.) and exports (copper, chemicals, etc.) of Pakistan would have postings as follows:

Pakistan	2307-1, 2
Imports	2307-1
Iron	2307-1
Steel	2307-1
Exports	2307-2
Copper	2307-2
Chemicals	2307-2

The user is told only to note co-ordinations with the same link numbers. Taube²⁹ has, however, pointed out that in the example that follows:

Lead coatings for copper pipes

100-1 100-1 100-2 100-2

links eliminate 'copper coatings for lead pipes', but also 'coatings for pipes'.

With 'roles' each keyword is classified by function, usually into a single array.²⁷⁻²⁹ These functions or roles are shown by digits attached to the postings; thus starting materials could be :1, products :2, and catalysts :3. A document (number 6903) on the oxidation of diethylbenzene to terephthalic acid by oxygen, with cobalt stearate as catalyst, would (assuming the organic compounds are indexed under these names) have entries:

• •	Diethylbenzene	6903 : 1
	Oxygen	6903 : 1
	Terephthalic acid	6903 : 2
	Cobalt (compounds)	6903 : 3
	Stearates	6903 : 3

An inquirer looking for information on the effect of oxygen on terephthalic acid will not retrieve this document; without roles, he would. It is, however, difficult to work out a suitable and simple series of roles for an index covering many subject fields.

The majority view seems to be that roles and links are not worth the extra cost and complication, but this is a question each designer of a new index must decide for himself. In rather small experiments, we have not found them easy to use. They increase relevance, presumably with some loss of recall. Another method of doing this, especially with long documents, and especially those (such as progress reports) which treat of many subjects, is to split them up into numbered sections, which must be marked in the document, and index by sections. Neither this method, roles nor links, is available at present with punched feature cards.

A keyword system is very easy to start. Chapter 4 of the Aslib Cranfield Project's *Report on the first stage* . . .⁴ deals with the problems encountered in setting up the four indexes. UDC requires sixteen and a quarter pages, alphabetical subject indexing sixteen pages, faceted classification twelve and a half pages, but Uniterm less than three pages. It is true that no very formal or rigorous control of new Uniterms was used, and that the three indexers compiled their own lists of Uniterms until six thousand documents had been indexed, when these 'were integrated and problems of synonyms and cross-referencing were resolved'. In starting a keyword index, keywords may be suggested by the nomenclature in documents, but every one should be considered before adoption to see if it agrees with current usage in the organization served.

There are two great dangers in keyword indexing from the indexer's viewpoint, and two disadvantages from the user's viewpoint. Fortunately the same method helps to solve half of them. The dangers for the indexer are 'word-indexing' and inadequate control of synonyms and near-synonyms. Word-indexing means indexing words and not concepts; if the same concept is represented by different words in different documents, it will be indexed by those words, and the information scattered. (This method is actually suggested by some writers on Uniterm.³⁰⁻³²) It is especially easy, even for conscientious indexers, with novel concepts for which nomenclature is not yet crystallized.

The only sound indexing, as I see it, is concept indexing. The control of synonyms and near-synonyms which this requires can only be rigorously and economically achieved by classification, the indexer's secret weapon. Keywords, when a few hundred have been collected, are classified by facet analysis, into *Things, Substances*, etc., as described above. This is quite easy for nine out of ten keywords. Combination of verbal forms, if used, will complicate this: one keyword may go into two or three facets. The full keyword should be written in the list for each facet applicable to part of it, and the part belonging to that facet underlined. Some single-word keywords will go into two facets because of double meanings of the word. This points to the need for splitting into single concepts. Each facet should now be divided and subdivided as described above for classification. When this has been carried as far as is practicable, the keywords in each class should be compared. Synonyms will come together, the best will be chosen, and all others referred to that one. Near-synonyms will come less close together, and more scrutiny will be necessary to find them, but it is not very difficult. If sufficiently distinct, they are kept, and linked by 'see also' references. Every remaining keyword must now be considered for homonymy, and also as to whether it should be linked by references to related words in other facets; combination of verbal forms will greatly reduce the number of these references.

Later, proposed keywords will be classified and checked in this way before admission.

For the user, the disadvantages of keyword systems are that he is confronted with a welter of words, which may or may not include all the words in which he puts his query, and that he needs, and rarely gets, the 'bird's eye view'. It would be something for a chemist in an engineering firm to know which keywords were chemical, thus eliminating most of the keywords in use. Ample 'see' and 'see also' references are of some help with the first difficulty. The same facet classification used for control can solve the second. Clark³³ has done something of this kind, and issues classified lists of keywords. Perhaps a better method is to put the classification of keywords on to a hinged-panel strip index, close to the keyword index.

This is, in effect, a classified index to a word index, and it is important to note that, because the classification does not now determine the location of any document in a file, or entry in an index, the need for mutually exclusive classes and of a single place for each concept vanishes. This means that bubbles and flames, for example, can be classified both as things and as phenomena. Some will think of them one way, some the other. It may be helpful, if the staff-time is available, to provide a second classification by disciplines, especially in an organization which covers a number of them. Such a classification can be very simple. This idea of a classified index to a word index merits, I think, more use than has been made of it, because it has most of the advantages of classification without many of its difficulties.

The keyword indexing of chemical compounds has special difficulties. Some trivial names are so universal that they cannot be excluded from the keyword list. Others are better referred to the systematic equivalents, e.g. Alum *see* Aluminium (compounds); Potassium (compounds); Sulphates. Inorganic

compounds can easily be broken up in this way, but organic compounds present more difficulty. Directions for breaking them up into hydrocarbon chains and rings, and radicals are given in the ASTIA Chemical Thesaurus³⁴ and by Gamble.³⁶ This is expensive in staff and user time.

For the document on 'removal of sulphur dioxide by means of lead oxide in the determination of carbon in iron and steel', for which facet-index entries have already been given (p. 293), the following list of keywords and references is supplied for comparison; keywords are in italics.

Carbon

• *Determination (chemical)*

Dioxides *see Oxides*

Estimation (chemical) *see Determination (chemical)*

Ferrous metals *see Iron; Steel*

Iron (metal)

Lead (compounds)

Oxides

Removal

Separation see also Removal (no posting under Separation)

Steel

Sulphur

Notice that *Oxides* covers both the lead and sulphur oxides. It is a minor difficulty of keyword systems that repetition of a concept cannot easily be shown without pre-co-ordination. 'Tools (i.e. cutters, reamers, drills, etc.) for machine tools' cannot easily be distinguished from 'machine tools' unless the latter is used as a bound term.

Before leaving keyword systems, I should like to deplore the term 'co-ordinate indexing' (with or without the hyphen). Cleverdon has shown that practically all indexing is co-ordinate indexing, the only exception being indexing by one concept per document. One can co-ordinate either at the time of indexing or at the time of search, and the term is therefore largely meaningless. It is true that it was also based on a certain fanciful resemblance to co-ordinate geometry, but that is concerned with dimensional magnitudes, and has little relevance to indexing.

With all specific indexing a recurring difficulty is what I call 'the label descriptor', necessary to define the subject, but corresponding to little or no information in the document. Papers on cod liver oil rarely contain any information on the cod, or its liver, but these are necessary concepts for indexing them. One possible answer to this is 'weighted indexing'. In indexing research reports at Pressed Steel, we have assigned 'weights' to descriptors on the scale 1-3, 3 meaning important information, 2 useful information, and 1 little or no information. We find it very difficult to be consistent, and I feel that the scale 5-10 (?1-10) used by Cleverdon and Mills,³ Figure 5, would be very difficult to use consistently.

There is some danger that in the present fashion for post-co-ordinate indexing systems their merits will be exaggerated. I hope I have not done this myself. Ours is a field in which really new ideas are seldom introduced. There is therefore a tendency to praise any new method to the skies, long before its merits

have been sifted in impartial tests, or a consensus of opinion has had time to form. The history of comment on chain-indexing is an illuminating example of this. We should be more scientific in our approach, and distinguish firmly between theory (however attractive) and proved fact.

When a version of this paper was presented to the Aslib Chemical Group, I had the temerity to provide a 'Suggested reading list for anyone about to make his own indexing system'. Most of the references have already been cited in this paper, but if any reader wishes for guidance in embarking on his own system, I suggest that he should familiarize himself with the reports on the Aslib Cranfield Research Project^{2, 4, 5} and with Vickery's *On retrieval system theory*.³⁶ For classification one could add to the works already mentioned the proceedings of the International Study Conference on Classification for Information Retrieval,³⁷ the *Report on the first stage of a test on the library catalogue of English Electric Co. Ltd, Whetstone*³⁸ and literature on the problems of classifying particular fields, where this exists, as it does for chemistry.^{39, 40} There is no reliable book on keyword systems, as here defined, but the papers cited should give a useful summary of the problems. There are, however, valuable bibliographies for Uniterm and keyword indexing.⁴¹⁻⁴³ As examples of keyword and Uniterm systems used with punched feature cards the papers by Boyd,¹⁸ Snel⁴⁴ and Wildhack and others⁴⁵ are of interest; such punched cards can be used with any post-co-ordinate system. The proceedings of the Conference on Co-ordinate Indexing Systems⁴⁶ should also be read.

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DISCUSSION

Mr D. R. Curry (Overseas Geological Survey) said that he would like to defend Mr Boyd's system¹⁸ of using a single feature card to represent various meanings. Both he and Mr Snel⁴⁴ had found in practice that other features combined in a search would distinguish the various meanings. For example, possible confusion between 'blind Venetian' and 'Venetian blind' could be resolved by adding 'person' or 'window'. In Mr Boyd's system, which had only four hundred features to cover the whole marine field, the indexing was carried out by a technical person. Feature allocation could not be a clerical operation.

Dr Campbell replied that he did not contest that meanings irrelevant to a particular search could largely be eliminated by co-ordinating with other descriptors. It was, however, not at all clear that they were always eliminated. He did not agree with confounding of homonyms for the reason he had given, and could see no reason (other than some saving in size of index) why the distinct concepts could not be separated at the start.

Mr D. I. Chapman (A. Roberts Boake & Co. Ltd) asked Dr Campbell how many keywords he had used so far in his index, and how many he anticipated having to use. Dr Campbell answered that (at the date of reading the paper) he had used about six hundred keywords for about that number of documents, with an average of eight keywords per document. He expected to use as many as there were concepts worth indexing in the collection, allowing for human frailty!

Mr J.A.Hanson (Ciba (A.R.L.) Ltd) commented that, judging from the cards handed round, Dr Campbell appeared to include trade names among his keywords. He thought this was acceptable in an alphabetical subject index, but perhaps expensive with punched keyword cards. He asked if Dr Campbell had limited his inclusion in any way.

Dr Campbell said that this depended on the purpose of the trade-name entry. If it was only to give the name of the firm owning the name, and the kind of product, Mr Hanson's comments were true, and there was no point in using punched cards for that. The trade names used as keywords were those for which there was other information, for example on the structure of the body of a given model of car.

Mr D.I. Chapman (A.Roberts Boake & Co. Ltd) asked Dr Campbell what kind of material his index covered. Was it only company reports, or did it cover pamphlets, patents, the literature, etc.? He believed that the Brisch-Vistem punched cards which had been passed round, with ten thousand spaces for holes, were the largest available. He asked whether this limited the size of index, and what happened when more than ten thousand documents had to be indexed.

The speaker said that the original keyword index was for a 'technical pamphlet' file, covering papers in periodicals, reprints, preprints (common in engineering literature), pamphlets and, in general, specialized published literature apart from books. It was started to serve as a temporary index until a faceted classification had been made. The latter took much longer than expected, and the keyword index had been unexpectedly satisfactory, so that it was made permanent. It was still on 8 in. $\times$ 5 in. cards, but when the classification and revision of keywords, on the lines given in the paper, had been completed, it would be transferred on to 10,000-hole punched cards. This would limit the size of index, and when that number of documents had been indexed, a fresh series would be started. This was no bad thing. A number of information units started fresh indexes, even of traditional types, every few years (five was a common period) in order not to have indexes clogged with entries for older material. In a technological search it was often possible to say with confidence that there would be no literature more than, say, five years old. This method also greatly reduced the labour of 'weeding', since the literature (and its index) of a five-year period of more than, say, twenty-five years ago, could in many circumstances now be discarded *en bloc* from a specialist library. The period of obsolescence would of course be decided by the subjects covered and the nature of the organization served. Chemical literature had a longer life than that of any other science he was acquainted with.

Dr Campbell also said that the index to Pressed Steel Co. Ltd research reports, referred to in the paper, was a separate keyword index, in which they were experimenting with weighted indexing.

Mr P.H. Scott (The British Petroleum Company Ltd, BP Research Centre) asked if it would be possible to incorporate roles into a punched-card system by punching them on separate cards. The speaker replied that he did not see how this could be done economically.

Letter to the Editor

JAPANESE TRANSLITERATION*

Dear Editor,

The simplest way for a Japanese to transliterate Kana is to assume that all European languages are out of step. The S's, which sound to me like

SA SHI SU SE SO, then become

SA SI SU SE SO, leading to

YOSIOKA (the T's are much worse). This system is probably quite adequate for the written language, but, like Basic English, is likely to prove a hindrance when dealing with the spoken word. That famous mountain, for instance, thoughtfully illuminated in impeccable symmetry by the setting sun—why, HUZU, of course!

On the principle of least confusion, languages that already pronounce SI as SHI are not likely to be troubled by the introduction of the H (though feelings would run higher on CHI-ANTI). However, arguments about transliterating Kana were going on long before, to use the local idiom, I was born in Tokyo at the age of one.

Japanese technical journals frequently use familiar English—well, American—words in preference to native ones, and although the graphs may be freely annotated with Roman letters, foreign words in the text will be written in one form of Kana. Apart from its irregularity, Kana is entirely inadequate for rendering all the noises used in English. The inability to distinguish between words like 'bulb' and 'valve' leads to frequent ambiguities; and the important point is that these ambiguities are just as real to the Japanese as they are to us.

Yours unrepentantly,

JOHN B. ROSCOE

39 Letham Road,
Strathaven, Lanarkshire
27th August 1963

* *Aslib Proceedings*, vol. 15, no. 5, May 1963, p. 147. *Ibid*, no. 8, August 1963, p. 243.

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Wanted

(1) REES: Chemistry of the defect solid state. Methuen, 1954. (2) CLIBBENS: The principles of the phase theory. Macmillan, 1920. (3) MAY: Industrial high frequency electric power. Chapman and Hall, 1949. Librarian, A.E.I. Harlow Laboratory, West Road, Temple Fields, Harlow, Essex.

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C.W. HANSON

What they Read and Why—Israeli Version

H. WELLISCH

Reliability of Scientists in Supplying Titles

LAWRENCE PAPIER

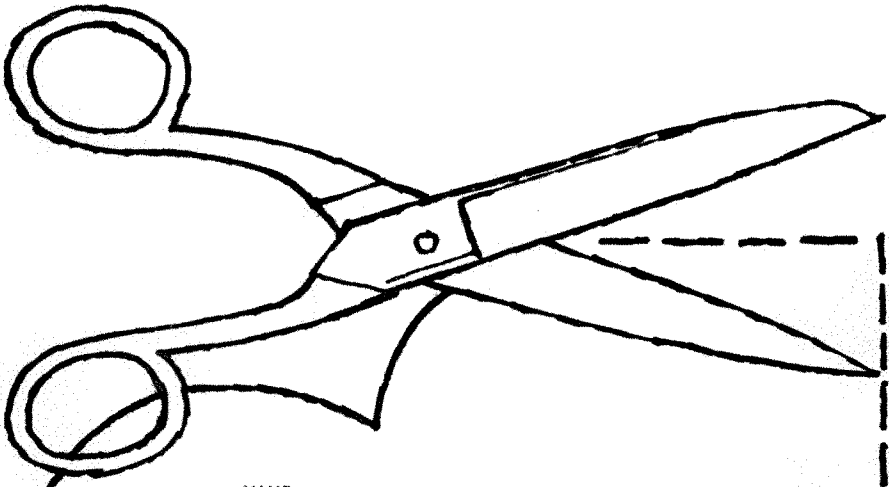


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Aslib Proc. vol.15 no.11 p.309-342 London, November 1963

You to snip

You know all about us — why
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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 15

November 1963

Number 11

ASLIB CALENDAR 1963

November

THUR.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'The production of library publications—"do-it-yourself" methods, not editorial procedure', by S. B. Page.

TUE.26. Chemical Group meeting at Aslib, 5.30 for 6 p.m. 'Patents in the chemical industry', by R. Smither.

TUE.26 - THUR.28. Course on information from the Press.

December

TUE.3 - FRI.6. Junior introductory course to special library and information work.

THUR.12. Chemical Group meeting at Aslib, 5.30 for 6 p.m. Paper by a representative of *European Chemical News*.

WED.18. Aslib Christmas sherry party. See paragraph below.

January 1964

TUE.7. Electronics Group visit to BBC.

TUE.14. Electronics Group visit to BBC.

TUE.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'Sheffield School of Librarianship', by W. L. Saunders.

THUR.23 - FRI.24. The trade literature collection—repeat of course held in October.

February

TUE.4 - WED.5. Course on work with patents and elementary patent practice.

March

FRI.20. Scottish Branch annual general meeting and one-day conference, Glasgow.

April

THUR.9 - SAT.11. Aeronautical Group and Chemical Group joint annual conference at Cranfield.

June

FRI.5 - SUN.7. Electronics Group annual conference at Ashridge College.

DSIR Grant to Aslib

Substantially increased grant-aid has been promised to Aslib by DSIR for each of the next five years. The grant will be in two parts as follows:

- a* Grant equal to one-half of UK members' subscriptions, up to a maximum annual grant of £17,500; and
- b* Grant of up to £20,000 each year in support of Aslib's research.

It will thus be possible to earn annual grants of £37,500 compared with the £17,500 expected this year. To earn this sum it will be necessary to raise an annual subscription revenue from UK sources of £35,000, compared with approximately £20,500 this year. This form of incentive to member organizations to increase their support for the work of their Association is in accordance with established Government policy towards DSIR Research Associations, and the Council of Aslib is confident that it can rely upon member organizations to enable Aslib to take full advantage of the new offer.

Aslib Christmas Sherry Party

A Christmas sherry party, which has proved popular in other years, is being arranged again at Headquarters for Wednesday 18th December, from 5.30 p.m. to 7.30 p.m. Admission will be by ticket only, price 7s 6d; requests for tickets should be sent with a remittance to Aslib not later than 4th December.

On the same afternoon there will be a display of library literature and equipment in the Aslib Library, on the ground floor. This will be open between 5 p.m. and 6 p.m.

Non-member Subscriptions to Aslib Periodicals

Because of the continued rise in production costs and overheads, Aslib has reluctantly decided that the sale prices of its three main periodicals must be increased as from 1st January 1964. The following are the new rates for non-member subscribers:

- Aslib Proceedings*, 90s a year, single copies 8s;
- Journal of Documentation*, 70s a year, single copies 18s;
- Aslib Book List*, 40s a year, single copies 4s.

As a special concession to members of Aslib, no increase is being made at present in the prices to be charged for copies additional to those which members receive as part of their membership privileges.

Sir Lindor Brown

Members may like to know that Sir Lindor Brown, Aslib's immediate Past President, has recently been appointed as a new member of the Council for Scientific and Industrial Research.

Director of Aslib elected Treasurer of FID

Members will be interested to learn that Mr Leslie Wilson, Director of Aslib, was elected Treasurer of the International Federation for Documentation at its annual meetings in Stockholm. The Federation is developing ambitious plans

for expansion of its work. These will require considerably greater financial resources than have been available to the Federation in the past, and it is clear that the office will be no sinecure. Through the Director, Aslib will continue to be represented on the Bureau, or executive committee, of the FID—Miss Barbara Kyle, Aslib's Research Librarian, has ceased to be a member of the Bureau on completing her term of office as a Vice-President.

Biological Group

This newly formed group of Aslib held its first whole-day conference on 11th October 1963, and between thirty and forty members attended. The programme included a paper on biological information services in the United States, by Dr Charles W. Shilling, Director of the Biological Sciences Communication Project, and there was also a tour of the library of the British Museum (Natural History).

Members who are interested in joining the Group are invited to get in touch with the Liaison Officer at Aslib headquarters.

1964 Aslib Annual Conference

Members may like to note that the 38th Annual Conference will be at Exeter University, from 28th–30th September 1964.

Mr G.A.Lloyd

Congratulations are offered to Mr G.A.Lloyd, formerly of the British Standards Institution, who has joined the staff of the International Federation for Documentation as a classification officer. Mr Lloyd has long been closely connected with Aslib in his work as the BSI officer responsible for the UDC.

Mr R.A.Fairthorne

Mr Robert Fairthorne has taken up a new post as senior resident consultant with Herner and Company, the information systems firm, in Washington, DC. Mr Fairthorne was formerly Senior Principal Scientific Officer at the Royal Aircraft Establishment, Farnborough, and has often been a speaker at Aslib conferences and meetings. One of his research projects in the United States will be a study, on behalf of the US Air Force Office of Scientific Research, aimed at the unification of theory and practice in information retrieval.

***Does Your Firm need its own Information Service?* reprinted**

Copies of the second impression of this booklet, which was prepared by the Aslib Research Department for OECD, have now been received by HMSO. We understand that outstanding orders have been fulfilled. The booklet, which has been out of print for some months, can be obtained from HM Stationery Office, price 5s.

Special Libraries Association Publications

Aslib has recently concluded an agreement with the Special Libraries Association by which each will handle sales of selected books published by the other.

The scheme is intended to be of practical use to purchasers of Aslib publications in the United States and Canada and of SLA publications in the United Kingdom and Europe. A full list of SLA books currently being handled by Aslib is enclosed with this issue of *Aslib Proceedings* and further titles will be announced as stocks become available.

Information Courses

The next in the series of two-day 'appreciation' courses arranged by Messrs J. L. Jolley and Partners Limited will be held on Wednesday and Thursday 22nd and 23rd January 1964, at the Bell Inn, Aston Clinton. The fee will be 20 guineas. Further courses have been announced for 18th and 19th March and for 20th and 21st May 1964.

As they are planned at present, the courses cover the whole field of indexing techniques, with emphasis on co-ordinate indexing. It is thought, however, that there may be room for an easier but more specialized course dealing only with punched feature ('peek-a-boo') cards applied to the indexing of subject-matter. It would make no pretence to survey the field or to provide means of choosing between competing systems. Members who would support the idea of such a course are invited to get in touch with Messrs J. L. Jolley and Partners Limited, 46-48 Frogmoor, High Wycombe; Buckinghamshire.

Survey of Indexing and Abstracting Services

An international survey of indexing and abstracting services in the field of library science and documentation is to be carried out with the aid of a grant from the Council on Library Resources to the Library Association. The survey will be conducted by Mr H. Allan Whatley, F.L.A., Lecturer at the Scottish School of Librarianship, Glasgow, and editor of *Library Science Abstracts*. The investigation is expected to lead to recommendations on methods of production and other suggestions which may be helpful in bringing about greater effectiveness of such services.

Industrial Film Triennial

The fourth International Labour and Industrial Film Triennial will be held in Antwerp from 20th to 27th November. The Triennial is designed to survey the newest films on industrial research, industrial and technical information, professional and technical education, and labour problems. At least nineteen countries have contributed this year. Further information may be obtained from the Secretariat, 128a Frankrijklei, Antwerpen (Belgium).

French Scientific Publications on Tour

A touring exhibition of over two hundred publications of the Centre National de la Recherche Scientifique is to be on view in selected national and university libraries throughout Britain between October 1963 and June 1964. It will be at the University Library, London, from 2nd to 7th December. The exhibition has been organized by the Standing Conference of National and University Libraries in co-operation with the French Embassy in London, and further information

may be obtained from the Librarian, King's College, Strand, London WC2 (telephone Temple Bar 5454). Inquiries about the Centre National de la Recherche Scientifique may be made to Miss A. M. Vidal-Hall at the Cultural Counsellor's Office, French Embassy, 22 Wilton Crescent, London SW1 (telephone Belgravia 8080).

Scientific Instruments Exhibition

• The 1964 Exhibition of Scientific Instruments and Apparatus will be held in the Royal Horticultural Society Halls, Vincent Square, Westminster SW1, from Monday to Thursday 6th to 9th January 1964. The exhibition is arranged annually by the Institute of Physics and the Physical Society, 47 Belgrave Square, London SW1, from which details may be obtained.

Scientific Business

A new quarterly journal entitled *Scientific Business* has been launched by a group of British management executives and carries topical articles of a high standard—the August 1963 issue for example contains contributions on PERT (programme evaluation and review technique) and on interfirm comparison. There are also book reviews and abstracts of articles. It is published by the Creative Press & Publishing Co. Ltd, 4-6 East Street, Reading, Berkshire; the annual subscription is 45s, single issues 12s 6d.

Kelly's Directory

Kelly's Directory of merchants, manufacturers & shippers is being re-shaped to conform with the changing pattern of international trade. As a first step, the latest edition (for 1963) includes a greatly enlarged section for Continental Europe in which exporting manufacturers, producers, and some industrial services, appear under appropriate trade headings. The *Directory* is now published in two volumes and the *Index to trades and services* is issued as a separate booklet. The price complete is £5. Inquiries should be addressed to Kelly's Directories Ltd, Neville House, Eden Street, Kingston-upon-Thames, Surrey.

University of Florida Assistantships

Graduate assistantships are again being offered by the University of Florida Libraries for study leading to a master's or doctor's degree in a subject field other than library science. They are tenable for the academic year 1964-65 and the stipends are \$2,250 requiring fifteen hours' library duty weekly or \$3,000 requiring twenty hours' duty weekly. There will be no out-of-state tuition fees. Application forms should be requested from the Director of Libraries, University of Florida, Gainesville, Florida, and the closing date for application is 14th March 1964.

Expansion of Classifications Center

The Special Classifications Center of the Special Libraries Association is to expand its services and holdings under a National Science Foundation Grant. The Center has been housed since 1955 by the Library School of Western

Reserve University and holds a collection of about 850 classification schemes and subject heading lists, copies of which are available for borrowing or purchase. Under the new scheme the Center is to have its first Director, who will be Miss Barbara Denison, Research Associate and Assistant to the Dean of the WRU Library School. It is planned to widen the scope of the collection, provide consulting services, and publish a list of holdings. Requests for further information should be directed to the Special Libraries Association, 31 East 10th Street, New York 3.

Overseas members' contributions to *Aslib Proceedings*

Two of the articles in this issue are by overseas members who are unable to come to England to present their papers in person at evening meetings. It is hoped to give members the opportunity of seeing overseas papers in this way from time to time.

SUBJECT INQUIRIES AND LITERATURE SEARCHING

C. W. HANSON

Head of Research, Aslib

(Text of a paper presented at a week-end school organized by the South Wales & Monmouthshire Division of the Association of Assistant Librarians at Barry, Glamorgan, 29th-31st March 1963.)

IN this talk I am going to discuss subject inquiries—that is, inquiries for information about a subject, necessitating a literature search, however trivial, as compared with requests for specified documents. Subject inquiries are numerous. Preliminary results of a current Aslib investigation¹ show that in thirteen industrial libraries forming the sample, nearly half the ‘acts of library use’ on the test day comprised searches for information on a subject.

Answering subject inquiries is one of the most onerous forms of library/information work, making great demands upon your knowledge, talents and judgment. It is also one of the most fruitful and rewarding, because when someone specifically asks you for information you can be fairly sure that he really does want it, and will use it. There is little waste of effort here compared with the wastage inevitably associated with the routine dissemination of information.

I shall discuss the literature searches undertaken to find answers to subject inquiries, the bibliographies that may result from them, and the forms in which your answers can be presented. I shall confine myself largely to scientific and technical inquiries because this is where my special knowledge lies; but I must point out at once that even in scientific establishments around 15 per cent of the inquiries put to the library are non-technical—dates and places of meetings, titles and addresses of organizations and so on. It is essential therefore that technical libraries should be equipped to answer non-technical questions unless these are specifically catered for elsewhere. They must have directories, membership lists and general reference books, and the staff must know how to use them.

Elucidating the inquiry

When you receive a technical inquiry, the first thing to do is to define and clarify it—to decide, in your own mind or by asking the inquirer, just what the inquiry, which may be vaguely phrased, really involves, and what kind of answer is likely to prove most useful to that individual inquirer. This preparatory stage is important, and I wish to stress it. There are usually several 'correct' answers to the same question, but they will not all be equally useful to the inquirer. A 'correct' answer may be too voluminous or too skimpy, too general or too specialized, too advanced or too elementary to be useful—or it may be too late. By proper preparatory thought you can save yourself work and avoid disappointing your client.

Before starting serious work on a serious inquiry you must ask yourself (or, where appropriate and possible, your inquirer) such questions as:

does he want a great deal of information, or only a few representative papers?

(When in doubt, plump for the second.)

does he want information about recent work only?

is he concerned with the subject as a whole, or with particular aspects or applications?

does he want full texts, or would abstracts or a bibliography be adequate? is foreign language literature acceptable?

how much does he know already? Has he already made a search?

when does he need the information?

You may have to answer these questions yourself as best you can. If you can ask the inquirer, so much the better. But ask them you must.

Here is a simple example. You are asked for 'some information about'—note this typically vague wording—man-powered flight. Instantly, and almost instinctively, you must think:

recent efforts to win the Cremer prize only, or historical as well?

news stories and popular accounts, or technical data?

emphasis on the machine (design, construction, etc.) or the man (anatomy, biology, etc.)?

and so on. Finally, have you got a week to answer, or does the man need the information in half-an-hour, before he goes to a meeting? Obviously, the answers to these questions will affect the steps you take to provide the information.

Pattern of inquiries

Inquiries received by a technical library will be very varied. They will not only be on many subjects, some of them outside the central subject interest of the library, they will also be of many kinds, ranging from quick reference inquiries with precise answers, for example, 'what is the melting point of lead?', to inquiries necessitating detailed searches of literature, with no end point, for example, 'means of producing low temperatures'. The library must be prepared to tackle them all within the limits of its resources.

It may be useful to try to give you a rough idea of what to expect. Here are three sets of figures derived from research results. They all relate to industrial and research libraries.

SAMPLE OF THIRTEEN INDUSTRIAL LIBRARIES
(current Aslib research)¹

Percentage of searches on a test day which were for various kinds of information (total 289).

	(%)
Description of object/process/method	26
Simple fact or figure	20
Background reading	13
General ideas and stimulation	12
Guides to further reading	11
Material for purposeful study	9
Working document (tables, curves, instructions, etc.)	7
Other	2

BRITISH PETROLEUM COMPANY'S TECHNICAL INFORMATION AND
LIBRARY SERVICE²

Types of answer supplied to inquirers (total 410).

	(%)
A few documents: medium coverage of narrow subject	69
Single fact or figure	18
Bibliography: intensive coverage of narrow subject	8
Textbook: light coverage of broad subject	2
Bibliography or review: intensive coverage of wide subject	1
Other	2

'SHELL' RESEARCH LIMITED, THORNTON RESEARCH CENTRE³

Numbers of documents provided in answer to inquiries taking more than half an hour (total 622).

Number of documents provided	1-3	4-7	8-15	15 +
Percentage of inquiries	56	27	10	7

These figures illustrate—taken alone they do no more than that—some points I wish to stress. Big detailed searches yielding long bibliographies or many documents are not common, and it is unwise to base your plans on the assumption that this will be your usual task. The intermediate level of inquiry, satisfied by a few selected documents, is much more common. And the demand for a single fact or figure is considerable, so that you must have plenty of technical quick reference tools—handbooks, data books and so on.

Searching

So much for the types of inquiry you may have to tackle. I will now turn to the methods of answering them. I will confine myself mainly to searches of *literature*, simply reminding you in passing that people as well as documents are sources of information, but that outside experts should not be bothered unless their expertise is really necessary. First use your own documents for all they are worth. Do not pass the buck unless you must.

The way you tackle a literature search depends upon many factors: the subject of the inquiry, and your own personal knowledge of it if any; the holdings of your library and your knowledge of them, and the extent and nature of its catalogues and indexes; the published bibliographical tools available; your assessment of the kind of answer needed; and above all, the time available.

I will deal first with the time factor. In practice well over half your inquiries will be answered within half-an-hour because they must be, because that is time enough, or because it is accepted that longer searches are not part of your job.

Broadly speaking, if you have half an hour or less, you must go to the most likely sources first: there will be no time for a methodical comprehensive search.

For this quick search you must know your library very well. If the inquiry is for a single fact or figure, go at once to the appropriate reference book, or data compilation, which you should know. If it is broader, but obviously within the field covered by your library and therefore likely to have been indexed, go to your card index, which may give you, or lead you to, the answer straight away. Consult your immediate colleagues, but do not spend much time telephoning, even internally. The man you want may not be there; if he is, he may not know the answer; and even if he does, he will give it to you verbally over the telephone, whereas you will normally need a written text which you can hand to your inquirer. A precise literature reference is often the best answer to try for on the telephone. If you have not got on the track of the answer by these means within ten minutes or so, go to the appropriate abstracts journal and search there, working backwards in time from the most recent indexed volume, stopping when you have found say half-a-dozen promising abstracts. Get from the shelves any of the originals the library holds—you should be able to memorize the library's periodical holdings up to a couple of hundred titles at any rate—and keep out the abstracts of the others. This is only a generalized outline of course; there are many possible variations. The main points are: know your stock; and remember that your card index will not be complete, particularly in marginal fields, so if you draw a blank there do not assume that there is not any information. Remember that telephoning takes time, and seldom provides the answer in the form in which you will need it a few minutes later.

When you are not limited to half an hour, but have some hours, days or even weeks to furnish the information, you can afford to—and should—approach the literature more methodically; but time still enters into the matter. If the time limit is two days or less you will probably not be able to obtain from outside documents which your search suggests would be useful but which you do not hold; you will have to depend on what you do hold in your own library, telling your inquirer that additional material exists and can be provided after a delay.

Having reminded you of this limitation I will proceed on the assumption that you have adequate time for your search.

First, if you know virtually nothing about the subject of the inquiry and perhaps do not even understand the terms used in it, look them up in a technical dictionary or encyclopedia. Next, look in your own and published lists of bibliographies to see if one already exists. If it does, it may limit your work, or even make it unnecessary. Then make a quick pilot search to give you some idea whether much or little literature on the subject exists. Look in your card index to see roughly how many cards there are in the relevant section. Note any books and glance at the bibliographies and references in them. Look up a few key words in the index of the appropriate abstracts journal and note roughly the number of entries. These steps will tell you whether there are going to be tens, or hundreds, or thousands of documents to be considered, or whether you will have to search hard to find even one. If it looks like being a big job taking a long time, warn your inquirer. He may decide to re-define and limit his inquiry. For my immediate purpose I will assume however that it remains a big job; but remember that in practice the need for complete searches is rare—usually you will be able to stop far short of completion. At this stage, in the light of your estimate of the size of the search, decide how you are going to record the results. Are you going to write down references only, or complete abstracts, or brief notes—on sheets of paper, on cards, in a loose-leaf book? Will you do the job once and for all or will you need to go back over it after you have examined what you have found? These matters are important on a big job. Whatever you do, get your references down clearly, accurately, and completely.

There are broadly two approaches to a complete search, and you must use them both. In one method you search first for a few key papers, particularly review papers, follow up the references given in them, and then the references given in those, and so on, snowball fashion. In the second you search methodically the appropriate abstract journals, working backwards from the most recent. In addition, when you have discovered the names of people who frequently write on the topic, look up all their papers via the author indexes of abstract journals.

How do you find the first few key papers? If in the field covered by your library, consult the card index. If not, consult abstract journals. How do you find out which are the appropriate ones? If they are in your own field, you should know them and have them. If not—and in any case to be on the safe side—consult *Index bibliographicus*⁴ which is a classified list of abstract journals.

As soon as you find a good review article, stop and read it. It will tell you enough about the subject to enable you to continue your search with greater understanding and confidence. In most scientific and technical fields abstract journals are the most valuable single reference tool (except sometimes for your own card index); but they have their limitations. You cannot usually trace through their annual indexes articles less than two years old, or through individual issues articles less than six months old. For recent work you must search the *British Technology Index*⁵ for English papers, title lists and indexes where these exist, and individual issues of original journals thought to be 'likely'. (A quarter to a third of the important articles on a subject are likely to

be published in the few journals wholly or mainly devoted to that subject.) Few abstract journals cover patent specifications or university theses and, with notable exceptions such as *Nuclear Science Abstracts* and the Research Associations' abstract bulletins, few cover at all well semi-published reports, or papers published in the proceedings of conferences. (Aslib found⁶ that half of the last type could not be traced via English-language abstract journals.) For patents you must use specialized publications, and the indexes of the Patent Office Library. Theses are covered by the *Aslib Index to Theses*.⁷ For United Kingdom semi-published reports, to which there are no satisfactory comprehensive guides, search the lists issued by 'likely' establishments and ministries, and for United States reports the publication *US Government Research Reports*.⁸ For reports of conferences, congresses, etc., you will find the *Annual International Congress Calendar* useful.

For rapid and effective searching you must know your abstract journals really well: not just their titles and where they are on the shelves, but their arrangement and sub-division, what they cover and what they do not, and their indexes.

Normally you will do most of your search, and almost certainly start it, in your own library. If you find you need to see many documents not in your library, it may pay you to visit a big library which is likely to hold most of them and consult them there rather than to borrow them by post. Borrowing can be a slow and uncertain process—although the rapid service being provided by the National Lending Library for Science and Technology is transforming the situation—whereas with all the material in front of you you can examine, compare, note or reject at high speed.

I will not attempt to give detailed examples of searches, but it may be helpful if I analyse roughly the results of a complete search in a narrow field to illustrate the scatter of items through the literature. I take as an example the bibliography in *Knife-edge bearings* by P. J. Geary.⁹ This covered the literature of the subject for about fifty years. It aimed at completeness and I think achieved it. It was compiled as part of a research programme, not in answer to a specific inquiry.

I have not checked to see how many of the items could have been found solely by using abstract journals, but I would guess that few except the periodical articles, and not all of them, would have been covered.

Points to note are:

- eight papers (the right eight) out of 166 (5 per cent) would provide an excellent answer to most requests for information;
- the complete bibliography is twenty times as long and includes many kinds of literature;
- not much more than half of the total would be likely to be found in abstract journals;
- the principal papers were published over a period of twenty years; but the later ones could be expected to refer to the earlier ones.

I would emphasize again the point made earlier: a complete literature search even on a narrow subject is a big job, but fortunately is seldom necessary. Often, of course, you are searching not for general information about a subject, such as soldering, but for a specific detail such as the composition of a particular flux. In these cases you stop your search when you find the information required.

BIBLIOGRAPHY ON KNIFE-EDGE BEARINGS⁹

Principal texts*	8
Secondary texts: of lesser importance, but relevant	151
Supplementary: references found, but original texts unobtainable	7
	166
English language texts	124
Foreign language texts	42
	166
Periodical articles	93
Books	27
Standard specifications	16
Patent specifications (patent search not claimed to be complete)	15
Semi-published documents	12
Theses	3
	166

* The eight principal texts

United Kingdom periodical articles, dated 1933-52	3
United States periodical articles, dated 1932-49	3
German periodical article, dated 1932	1
Japanese periodical article, dated 1951	1
	8

Giving the answer

So much for searching. I must now complete the picture by discussing the ways in which you provide your inquirer with the answer.

A single, simple fact or figure. Give it to him, but check it in a second source as a safeguard against misprints. Keep your eye open for obvious mistakes due, say, to errors in transcribing, for example mm. instead of cm.

Two or three papers on the subject—the commonest form of answer. Tell him briefly what sort of search you made: for example, 'I searched *Physics Abstracts* but not the more specialized abstract journals, and I have ignored patents'. Give him an idea also of how much, or how little, further literature there is: for example, 'These are three documents I have selected from several hundred' or 'These are the only relevant papers I can find'.

A large number of original documents. Tell him they are ready and ask him to come to the library to look at them. He can then scan and select what he wants to take away. This is better than sending the whole bundle. If the documents include some borrowed from outside, you must try to have them all available at the same time. If necessary, buy photocopies instead of borrowing, or borrow and make your own photocopies.

A bibliography, references only, or with abstracts. This can seldom be the final answer, but may be a necessary first step. Arrange it in the way that will make it easy for him to use. Unless it is short (less than one page) alphabetical by author will be inconvenient. So will chronological unless his interest is historical. Some form of broad subject classification is usually preferable. If it runs to several pages, indicate which items you judge to be important, and distinguish review papers which he may wish to read first. Indicate how it has been compiled, what it covers, how complete it purports to be—and date it. These particulars will be vital later on when someone else needs to use it again. Indicate which items, if any, will have to be borrowed from outside if he wishes to read the full text.

I started by saying that answering subject inquiries by searching the literature is onerous but rewarding. I hope I have given you at least some useful hints on how you can satisfy your inquirers without wasting your effort.

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WHAT THEY READ AND WHY—ISRAELI VERSION*

H. WELLISCH

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WATER Planning for Israel, Ltd is the Israeli Government's central planning agency for countrywide projects of irrigation, drainage and water power. Its Technical Library serves the staff of engineers and technicians of the organization itself as well as technologists in other governmental, public and private institutions concerned with all aspects of hydrology and hydraulic engineering. The library's stock consists of about ten thousand books and bound volumes of periodicals, several thousand pamphlets and internal technical reports, and has a collection of articles and theses on microfilm; about two hundred periodicals and serials are taken currently.

In the autumn of 1962 it was decided to make an inquiry into the use made of technical literature and into the reading habits of the organization's engineers and technicians. A similar inquiry made in England by the Department of Scientific and Industrial Research in 1956¹ served as a model for most of the questions asked; since the full report was not available in Israel at the time of the inquiry, the questions were taken or adapted from the summary² of the above-mentioned report and from a paper read at the 34th Annual Conference of Aslib.³ The size of the library and its parent organization as well as the type of readers investigated are fully comparable to those in the British inquiry, while other aspects do not lend themselves to direct comparisons: firstly, while the British survey dealt with the electric and electronic industries, the Israeli one was concerned with civil engineering; secondly, the Israeli survey had to be conducted by means of a questionnaire since, for technical reasons, personal interviews could not be arranged; thirdly, the technologists in the Israeli survey have no common educational background since they received their degrees or certificates in many different countries (including Israel itself) and speak many different mother tongues which, incidentally, are not always identical with the language of their technical education. Their common working language is, of course, Hebrew.

* See note on p. 314.

About four hundred questionnaires were sent to the organization's technologists, and 152 answers were received. A few questions not asked in the British survey were added, mainly in order to test the readers' opinion about the library's physical conditions and some of its bibliographical services. In the following analysis, the British percentage figures are given where similar questions were asked, thus forming a common basis for comparisons.

If you want information on a technical problem which you cannot solve yourself—to whom do you apply first?

TABLE I

Source from which information would be sought	Number	Percentage	
		Israel	England
The organization's library ..	79	52.0	22
Someone within the organization	54	35.5	46
Various people	15	10.0	14
Other organization	1	0.6	10*
Own library	3	1.9	—
	152	100.0	—

* This is the sum of the percentage figures for the categories, Supplier or customer, Government research station, and Other research station, in the British survey.

It seems that more than half of the Israeli respondents would *first* look for a solution of any technical problem in the organization's library—a rather high percentage, and more than twice that in the British inquiry. An explanation might partly be sought in the fact that Israel lacks the many and variegated information sources open to the British technologist, so that his Israeli colleague has to rely first and foremost on the library nearest to his place of work. More than a third of the respondents are in the habit of asking colleagues when in need of advice, which confirms the findings of various other investigators that personal contacts play an important role in the dissemination of information. Outside organizations are consulted in only a few cases; this may be due both to the scarcity of other research institutions and to the subject field: whereas technical and scientific information on electricity and electronics is available in many places in England (as it is also in Israel, though of course to a lesser degree), scientific and technical data about water in all its engineering aspects are virtually concentrated in Israel in the library of Water Planning for Israel, and only a few other libraries hold some material on certain specific aspects of the subject. Also, there are no suppliers and customers in the same sense as in the electricity and electronics industries.

The category 'Own library' was not originally included in the questionnaire, but three people referred expressly to this source of information, and maybe

some more would have done so had the question been asked, since it is known that many technologists in the organization keep not only a small private library at their place of work but also make their own card index to important articles, reports and other material relevant to their work. (The library issues suitable pre-printed index cards to interested readers and these are in very heavy demand.)

Does the library generally supply you with the information you need?

TABLE 2

<i>Answer</i>	<i>Number</i>	<i>Percentage</i>	
		<i>Israel</i>	<i>England</i>
Yes	78	51.3	77
Qualified answer	43	28.3	11
All positive answers	121	79.6	88
No	27	17.8	12
Can't say	4	2.6	—
	152	100.0	100

A very high percentage (nearly 80 per cent) of the respondents said that the library satisfied their needs for technical information, though slightly more than a third of them had some reservations. Before analysing those (see Table 3 below) let us have a look at the people who answered the question in the negative. When their answer is correlated with some of the same group's answers to other questions, an interesting picture is revealed; when asked later how their attention was drawn to material pertinent to their work, ten persons or 37 per cent of the 'nay' group maintained that this was done by the library! And four of them even said that this was the outcome of systematic literature searches. Now, if the library is mainly responsible for drawing the attention of somebody to pertinent literature and if literature searches are made (clearly a thing for which it is essential to have the services of a library), then it is a little hard to understand why a negative answer should be given to the above question. This is one of the problems posed by the written answers to the questionnaire, which could have been solved, at least partially, by personal interviews.

Is dissatisfaction with the library's services related to reading habits? Ten persons in the 'nay' group read less than two journals regularly, and four of them confessed to not reading *any* technical journal! Together, 52 per cent of the dissatisfied technologists read little or nothing at all—at the same time complaining of inadequate library service.

Do you have any difficulty in getting information on a certain subject—and why?

TABLE 3

<i>Difficulty</i>	<i>Number</i>	<i>Percentage</i>	
		<i>Israel</i>	<i>England</i>
None	69	45.4	71
No literature on subject	40	26.3	7
Delay in getting literature	24	15.8	6
Impossible to get desired material	7	4.6	—
Other difficulties	6	3.9	6
No answer	6	3.9	—
	152	100.0	

While the Israeli library seems to get far heavier use than the average British industrial library, the percentage of readers who declared that they had no difficulty in getting information is much smaller—less than half of the respondents. It would seem that the demands made on a technical library grow not only in quantity but at the same time in depth. In other words, more readers mean not only more questions asked, but also more detailed and intricate questions. This is also fully in accordance with the library staff's experience. 54.6 per cent of the respondents were experiencing difficulties of some kind in getting at desired information (this figure includes the qualified answers to the second question above), the most serious of them being the fact that there is 'no literature on the subject in the library'. The rather high figure for this complaint (more than a quarter of the total) is somewhat surprising, because it is not borne out by the facts of daily library routine. It is of course impossible to satisfy each and every demand from the library's own resources, especially so since the organization's work is very diversified and touches upon many aspects of civil engineering as well as on some special applications of electrical and chemical engineering. But, by and large, the library has at least some literature on most subjects likely to come up within the framework of the organization's activities, and every reasonable effort is made to secure necessary information from outside sources in case it is not immediately available in the library. Still, the fact remains that the most frustrating thing that can happen to a reader is not to find material on a subject in the library—and it matters little whether this is due to a real lack of material, or to the reader's imprecise question or to the library staff's inadequate handling of the request.

A partial explanation might also be that readers are in fact complaining about not being furnished with the desired literature *immediately*; the comparatively

high figure of complaints about delays in getting the literature (15.8 per cent) would point to such a conclusion, though those who answered this question were generally eager to point out that the delay they complained of was mainly that caused by the routing of periodicals (some periodicals are rather heavily used and though more than one copy is bought of the most important ones, there are still up to about fifteen to twenty readers to each copy, which means that the last reader on the list has sometimes to wait two to three months and even more before seeing the journal).

The percentage of readers indicating that it was impossible to get the desired material (4.6 per cent) tallies with the actual experience of the library's staff: not more than about six to eight questions out of a weekly average of 120 have to be left totally unanswered (and most of these questions are only indirectly related to the organization's work, while some of them quite obviously are motivated by purely private interests). In a recent Aslib survey⁴ the figure of outright failures was even higher, 13.3 per cent; it must be remembered, though, that this survey was made in thirteen different libraries, while the Israeli figure pertains to only one library with a relatively narrow subject field.

How is your attention drawn to articles or books pertaining to your work?

TABLE 4

<i>How attention drawn</i>	<i>Number</i>	<i>Percentage</i>
The library	88	57.9
Colleagues within the organization	52	34.2
Persons outside the organization	17	11.0
Systematic literature search	48	31.5
Abstracts	34	22.4
By chance	21	13.8
Don't know	3	1.9

(Many respondents gave more than one answer.)

The figures for the library and for colleagues within the organization correspond roughly with those given in Table 1 and this is probably no coincidence. If you are wont to go to the library whenever you have a problem you cannot solve by yourself, then this will probably also be the place where you come across pertinent literature of all sorts. Besides, the library is actively drawing the attention of readers to articles and books in their various subject fields by the publication of a classified '*Bibliographical Bulletin*'. On the other hand, if you are in the habit of asking your colleague's advice, then you will probably also be tipped off by him about new books, articles and other material.

The percentage of technologists conducting systematic literature searches is rather high (31.5 per cent as compared with 18 per cent in the British survey,

though the figures in this case are not quite comparable since the British question pertained to a certain article only). Chance, on the other hand, is responsible for a much smaller part (13.8 per cent as against 41 per cent). When we come to abstracts, the picture is not so rosy: only 22.4 per cent of the respondents used them actively, while the percentage of those who read them regularly (i.e. were generally aware of their existence) was somewhat higher—29.6 per cent (see also Table 5 below). This means that about seven out of ten who know about abstracts put them to any use (the corresponding British figures are about eight out of ten). When so much effort and money are being spent on the preparation, acquisition and dissemination of abstracts, it is distressing to see that only slightly more than one quarter of the technologists know about them and still less use them in their work. On the other hand, only a certain part of the organization's subject interests is covered by good and reliable abstract services and not all of these are accessible to every technologist because of language difficulties. The picture would maybe have been quite different, had the survey been made in the chemical industry where abstracts are known to be heavily used.

How many professional periodicals do you read regularly?

Whatever the differences in other areas, there was full agreement with the British findings in respect to this question. The mean number of periodicals regularly read or scanned was six, the mode being four. These figures are also corroborated by the routing lists of the various periodicals in the library. Twenty respondents or about 13 per cent did not answer this question, though all of them answered the next one about the type of material read by them. As already noted above, only four persons confessed to not reading any periodicals at all.

What do you generally read in technical periodicals?

TABLE 5

Kind of material read	Number of all readers	Percentage		
		All readers	Those reading	
			1-5	6 or more
Table of contents	51	33.5	40.5	42.8
Theoretical articles	68	44.7	52.8	46.4
Practical articles	123	80.9	96.1	85.7
Abstracts and bibliographies	45	29.6	28.8	53.5
Advertisements	39	25.6	28.8	32.1
Short news	47	30.9	37.5	39.2

(Many respondents gave more than one answer.)

These figures too are remarkably like those reported in the British survey, especially the heavy use of practical articles of the 'how-to-do-it' type that are read by more than 80 per cent of all respondents. The surprise was the high percentage of technologists reading (or at least professing to read!) theoretical articles (those with 'much mathematics'!) because from a count of such articles demanded by readers after the publication of the *Bibliographical Bulletin* it was thought that only about 25 per cent of all readers were interested in such matter.* A partial explanation may be sought in the fact that the journals in our central subject field such as *Water Power*, *Journal of the American Water Works Association*, *Water and Water Engineering*, *Water and Sewage Works*, *La Houille Blanche*, *Die Wasservirtschaft*, to name only a few, carry a mixture of both theoretical and practical articles; readers originally seeking only practical information often read the theoretical articles, too, once the journal has reached them.

Abstracts and bibliographies (including book reviews) are read by less than a third of the respondents, or by 29.6 per cent, taking into account all readers, irrespective of the number of periodicals read. A more thorough analysis showed, however, that there is a marked difference between those reading from one to five periodicals and those reading six or more: the second group read about twice as many abstracts as their colleagues in the first one, while the reading habits of both groups are about roughly the same with regard to other kinds of material. The results were about the same when the line was drawn after four journals. These results also confirm one of the British findings, namely that those who read many books, articles and reports also read many abstracts and that much reading does not necessarily mean superficial reading; quite to the contrary, a certain degree of sophistication is apparently needed both to read abstracts and to make intelligent use of them.

Where do you read technical literature?

TABLE 6

Place	Number	Percentage	
		Israel	England
At home	71	46.7	59
At place of work	8	5.2	27
At home or at place of work	79	52.0	6
In the library	7	4.6	3
In buses	5	3.2	2
No technical reading	1	0.6	2
Others	—	—	1

(Also here, many respondents gave more than one answer.)

Though the places named are the same as those in the British survey (the bus having been substituted for the train, because people in Israel commute by bus only), the Israeli answers differ at first sight quite considerably from the British ones. However, it is not clear how much reading is done at home and how much at work by those who answered the third question, but taking the rather low figures for reading at work and in the library, it would seem reasonable to assume that the bulk of all reading is done at home, after all. This would bring the figure for 'home' reading more in line with the British one. The library, surprisingly enough doing somewhat better than its British counterpart, is not very much used as a place for reading and study, but this is mainly due to the cramped quarters that give room to only three to four readers at a time. The library is to be moved to new quarters in the near future and it is expected that more technologists will then do their professional reading in the library.

Could the library's services be improved by one or more of the following things?

TABLE 7

<i>Improvement</i>	<i>Number</i>	<i>Percentage</i>
More floor space and reading room	81	53.3
More periodicals	34	22.4
Less periodicals	5	3.2
More books	19	12.5
in English	20	13.1
French	15	9.8
German	15	9.8
Russian	11	7.2
<i>Bibliographical Bulletin</i> once monthly	41	26.9
None necessary	3	1.9

Most respondents were eager to point out one or more possible improvements and only a tiny fraction thought there was no need for any improvements. More than half of the respondents urged an enlargement of the library and its reading room, which is in agreement with the general trend indicating the library's importance to a majority of technologists.

More frequent publication of the *Biographical Bulletin* was demanded by well over a quarter of the respondents—almost the same percentage that read and use abstracts and bibliographies in general—and these were also mostly the people who wanted more periodical subscriptions. All this goes to show that about one in four technologists shows an *active* interest in periodicals, abstracts and bibliographies—the most versatile of all vehicles of scientific and technical communication. But there are also some readers who want to see fewer periodicals and think that this would be an improvement. An investigation into their reading habits shows, however, that one of them does not read any periodicals

at all, one reads only one and three of them read not more than two. Obviously, he who reads no periodicals or at most one or two, would think that about two hundred journals are mere wastage.

The demand for more books in different languages is to be taken more seriously. This is probably a question that would not have been asked in a British library where the non-English book is rather the exception than the rule. Not so in the Israeli library which is used by a polyglot multitude of technologists, many of whom are able to read in four or five languages, including some rather exotic ones. Not all respondents answered the question and not all of those who did understood it properly: nineteen persons (12.5 per cent) merely answered that they would like to see more books without specifying any particular languages. The percentage figures for those who did answer correctly are given in Table 8, calculated from the total number of persons answering this particular question:

TABLE 8

<i>Language preferred</i>	<i>Number</i>	<i>Percentage</i>
English	20	32
French	15	25
German	15	25
Russian	11	18
	61	100

These figures correspond roughly to the percentage of books in those languages already in stock (with the exception of Russian), which shows that the selection of books in various languages is more or less adequate to the needs of the users. As to Russian books, they comprise at present only about 7 per cent of the bookstock and there is a definite demand for more of them; efforts are being made to buy important new Russian books, but since they can be acquired in Israel only in a rather haphazard way—to say the least—this goal is difficult to achieve. Hebrew books were not included in the questionnaire, since comparatively few technical books are published in Hebrew and every one of them in our fields of interest is bought as a matter of routine.

* * *

Though real and valid comparisons cannot be made between a countrywide survey comprising many libraries and another one made in one library only, there are certain common trends, especially regarding reading habits of technologists and the type of reading matter preferred. There is a real need to make similar surveys on a far greater scale in the main branches of science and technology and in different countries, in order to assess the use made of written information and the role played by libraries and information centres.

ACKNOWLEDGEMENT

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RELIABILITY OF SCIENTISTS IN SUPPLYING TITLES

Implications for Permutation Indexing*

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THIS study is an outgrowth of a broader one being conducted by the Biological Sciences Communications Project† on the validity or relevance of titles in describing the content of biological articles. It is restricted to the psychology portion of the total sample. The purpose of the study was to assist the author in gaining insight into the problems of documentation research, and to provide the project with a pilot study—one of several.

In considering the broader project, it was recognized that relevance is related to purpose and a title may be relevant for one purpose and not for another. In fact, its effectiveness in one application, for example, in verbal communication, may defeat its effectiveness in another, for example, in information retrieval. In the first case, we might want shorter titles and in the latter, longer ones. Another major purpose of titles is in tables of contents. Here the user decides whether to look at the article from the title as a whole. It was decided to restrict the present study to the effectiveness of titles supplied by the user in retrieving articles from a permuted-title index.

This study is concerned with word indexing and not topic or subject indexing. By doing this, it is hoped that a measure of objectivity can be introduced since we are not dealing with concepts, but rather the representation of concepts, in this case words. Words, unlike concepts, can be said to coincide or not. It can be said that 100 per cent coincidence in words used by index and retriever to describe a piece of work should result in 100 per cent retrieval regardless of whether the words truly represent the subject of the article or not. Reliability in composing titles on the part of author and reader can thus be taken as the measure of validity in the permutation application.

The sample to be analysed had been collected by others. Five psychology articles, previously selected at random, were sent to scientists working in the general field of psychology. Each article was sent to a total of twenty scientists. No indication was made of author, title, or publishing journal. The scientists were asked to supply a title for the paper on the basis of the supplied information. When fifty-one of the sentences had been returned, word frequencies were

* See note on p. 314.

† George Washington University.

tabulated and percentage of agreement was determined between scientist and author. Words with the same root were treated as equivalent; for example, relation = relationship = related. The 'small words' such as a, an, the, of, and so on, were not considered in establishing the percentage of coincidence. Each title was compared separately, and percentage of agreement was established. The individual results were added and then averaged.

It was found that 53 per cent of the scientists' words were found in the authors' titles, and 46 per cent of the authors' words were found in the scientists' titles.

If it is assumed that the scientists use the same words in approaching a permutation index as those they used in describing the article, and if we assign an equal probability of being used to each word, we can then say that the scientist has a 46 per cent chance of retrieving the article from a permuted-title index on the first try.

The average number of words used in the scientists' titles was about six. Typically, the scientists' chances of retrieving the article on the first trial are something like 50 per cent; on the second, 60 per cent; on the third, 75 per cent; on the fourth, 100 per cent. In actuality only one case was found among the fifty-one where the article could not have been retrieved at all; that is, no words coincided.

It is of some interest to see what happened when we eliminated general words (as is done in certain permutation schemes); it was found that now, 53 per cent of the scientists' words appeared in the authors' titles and 50 per cent of the authors' words appeared in the scientists' titles.

The list of general words that had been eliminated was compared with the Biological Abstracts list. It was found that, of thirty-six words eliminated, twenty-six appeared on the BA list; if variants are considered as equivalent, thirty occurred. It can be seen that the quantitative results would not have been materially changed if either list had been used in the study.

A further analysis was conducted to get an idea of the effect of providing authors and scientists with the same structured dictionary or thesaurus. Titles supplied by the scientists were rewritten in author-equivalent words, eliminating synonym, hierarchy, and whole-part differences. For example, in one case, the author's title was, 'Changes in attitudes toward the Negro in a southern university'. One scientist supplied a similar title but used the word 'college' instead of 'university'. The title was rewritten substituting the word university for college.

The significant thing here is not whether 'colleges' is used or misused as a synonym for, or is part of, or is a lower generic term to 'universities' but that the difference would be reconciled to some degree by a thesaurus. For the purposes of estimating the effect of supplying a thesaurus, we assume an obviously overly optimistic 100 per cent reconciliation.

Making this assumption, we find that 62 per cent of the authors' words appear in the scientists' titles and 61 per cent of the scientists' words appear in the authors' titles. If we had made the assumption that the use of a thesaurus would reconcile 50 per cent of the words indicated, the results would be 54 per cent and 57 per cent respectively.

A summary of results is presented in the table below:

<i>Study</i>	<i>Scientists' words in authors' titles (%)</i>	<i>Authors' words in scientists' titles (%)</i>
1. As it is	53	46
2. Eliminating general only	54	50
3. 100 per cent conversion of hierarchical and synonym differences	61	62
4. Eliminating general and converting hierarchical and synonym differences	73 (68)	70 (66)*

* 70 per cent determined independently. Adding effects of 2 and 3 to 1, we would get 66 per cent.

Several factors make it impossible to use these figures as absolute measures of retrieval probability. These are:

1. Would scientists use the same words in approaching a permutation index that they use in composing a title to describe work performed?
2. Are there substantial preferences between words chosen as retrieval 'handles' within a given title?
3. How much of the difference in words supplied in a title can be eliminated by providing a thesaurus?
4. When the scientist titled the paper, he had the author's paper to work from. If they both tended to select words appearing in the paper, one would naturally expect the coincidence to be close.
5. This study says nothing about retrieving minor and specific points in the article. This is a factor to keep in mind but no assumptions are made in this regard.

In addition to these major factors, it was stated above that 100 per cent coincidence should result in 100 per cent retrieval. Even this is not strictly true. It was found, for example, that 'Changes in attitudes toward the Negro in a southern university' does not always equal 'Changes in attitudes toward the Negro in a southern university'. In one sense we might mean changes in attitude toward the presence of Negroes as students in a southern university, and in another sense changes in attitudes toward Negroes in general on the part of students of southern universities.

A person investigating the first problem would retrieve a rather inapplicable paper from a permutation index. In general, this type of ambiguity should

result only in 'false drops', that is, inapplicable information. This is obviously a problem but a less serious problem than those resulting in denied information.

The factors indicated above would have a considerable effect on the absolute percentages. Their effect on the degree of difference between the 'as it is' systems, those employing thesauri, and those eliminating general words should be smaller. Since we make the same assumptions in each case, we can get some idea at least of the relative effects of using these systems.

It can be said that for this study, the elimination of general words by both user and author had little effect in increasing the retrieval probability. It was noted that the unilateral elimination of general words by the index would reduce the probability of retrieval. With regard to providing thesauri, this study seems to say 'the effectiveness of supplying thesauri depends on the effectiveness of supplying thesauri'. This is not strictly true since an upper limit was established when we assumed a 100 per cent reconciliation. Therefore, it can be said that providing thesauri in the sample studied could only increase the first try probability from 46 per cent to a maximum of 62 per cent. Thus, it can be seen that even in this extreme case, the difference is not large.

It should be possible to provide the users of permutation indexes with instructions as to the maximum or even the optimum number of words to search before stopping. These instructions might read: 'Compose a title* for your search consisting of not more than X words. Select no more than Y of these words and look them up in the index'. At present there is nothing to prevent a user from looking a much greater or lesser number of times than is optimum. X, the average scientist's sentence length, was six; and Y, the maximum number of search times, is four in this study. Typically, the scientist would have to look only once to retrieve 50 per cent of the articles.

A word of caution is in order about the use of title indexing or other 'as it is' systems for retrospective searches on computers or punched card equipment. Consider the case where the probability of retrieval for each word or keyword is one-half. If the requirement is for the simultaneous retrieval of several terms, and it usually is, the probability of retrieval will fall sharply. Thus, if the search is for four terms the probability of retrieval in the above case would be $(\frac{1}{2})^4$ or one-sixteenth.

Further, if the search requirements are specified by a 'non-psychologist'—for example, a cultural anthropologist—the drop would be even more dramatic. To illustrate, if the probability of using each term was $\frac{1}{4}$ and the search was for four terms, the probability of retrieval would be $(\frac{1}{4})^4$ or about one two-hundred-and-fiftieth.

* This in itself might increase the chances of retrieving the article. At present there is nothing to prevent users from looking for subjects (the approach for subject indexes) in title indexes.

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NATIONAL CENTRAL LIBRARY

THE 47th Annual Report of the Executive Committee of the National Central Library for the year ending 31st March 1963 has recently been published.

Building operations began as anticipated at the end of 1962 and work on the foundations made some progress.

A considerable increase has taken place in the number of applications for inter-library loans received as compared with the previous year. While the easier type of request (mainly for current British books) is now dealt with locally in the Regional Systems, the demand for older works and those in foreign languages, as well as English language books published in America and elsewhere, continues to increase.

Funds were provided by H.M. Treasury to enable the Library to rent a large three-storey building at the Royal Arsenal, Woolwich (photographs included in the report). This will hold up to half a million volumes. It will act as an overflow for the book-stacks in the main building at Malet Place (and later at Store Street) and will make possible the acceptance of useful donations from libraries in considerably greater number than before. The Library is mainly interested in acquiring material in foreign languages and older British books.

The Minister of Education's Working Party Report on Inter-Library Co-operation in England and Wales was published in December, 1962. The Trustees were asked to comment on its recommendations. The fact that the method of financing the Library has been under discussion since the Roberts Report (February, 1959) has had the effect of preventing action on the proposal to expand the Library's book-stock.

Plans for continuing the publication of BUCOP on a current basis have been discussed and negotiations undertaken with the World List of Scientific Periodicals with a view to merging the two organizations.

It was decided to use punched cards for preparing copy for the Press. It is hoped to begin publication on a quarterly basis in 1964 and to produce annual and quinquennial cumulations.

7,902 volumes were purchased for the stock of the Library (including 1,011 for adult class purposes and 4,794 British Government publications). Nearly 19,000 volumes, hitherto uncatalogued, were catalogued by simplified methods and transferred to the Woolwich Building and 3,403 volumes acquired by gift were catalogued and added to other sections of the Library's collections.

The total number of books catalogued (and thus made available) during the year was 30,033 bringing the total available stock to 214,000 volumes. To this will be added eventually another 46,000 still uncatalogued. Simplified methods of cataloguing will, it is hoped, facilitate the amalgamation of all the Library's catalogues and Union catalogues into a single master Catalogue.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the library.

• Books and Pamphlets

AMERICAN FEDERATION OF INFORMATION PROCESSING SOCIETIES

AFIPS conference proceedings volume 23: 1963 Spring joint computer conference. Baltimore, Md, 1963. 413 p. illus. tables.

AMERICAN MATHEMATICAL SOCIETY

Development of the Photon for efficient mathematical composition . . . Providence, Rhode I., 1962, 6 p. (Report no.1).

ARTANDI, SUSAN SZERDAHELYI

Book indexing by computer. Ann Arbor, Michigan, University Microfilms, 1963. 207 p. xerox.

BECKER, JOSEPH, and HAYES, ROBERT M.

Information storage and retrieval: tools, elements, theories. New York, Wiley [1963.] 448 p. illus. tables. 72s.

BRITISH STANDARDS INSTITUTION

Specification for magnetic tape for automatic data processing. London, 1963. 20 p. tables. (BS 3658 : 1963).

CORNING, MARY E.

Country reports on the organisation of scientific research: United States. [Paris], OECD [Directorate for Scientific Affairs], 1963. 95 p. tables.

*FAWCETT, F. DUBREZ, comp.

Cyclopaedia of initials and abbreviations. London, Business Publications, [1963.] viii, 185 p. illus. 40s.

FEDERATION OF BRITISH INDUSTRIES

Civil research policy: a report of an FBI working party. London, [1963.] iii, 11 p. 2s 6d.

FORD FOUNDATION, New York

Scholars' work and works. New York, [1963?] 33 p. illus. Discusses problems relating to publishing and librarianship.

HELL, GYORGY, and others

Gépi fordítás: algoritmusok orosz nyelvű szövegek elemzésére [Machine translation: algorithm for Russian . . . by Gy. Hell, F. Kiefer, Gy. Sipöczy and D. Varga.] Budapest, [Jánszky Lajos], 1963. (Hungary. Országos Műszaki Könyvtár és Dokumentációs Központ. Időszzerű Műszaki Dokumentációs Kérdések, no.3-4.) 274 p. tables. mimeog.

HERNER, MARY, and others

Scientific and technical news media in the English language . . . Washington, DC, Herner & Company, 1962. 43 p. tables.

INTERNATIONAL CONGRESS ON MEDICAL LIBRARIANSHIP, 2nd, Washington, DC, June 16-22, 1963 and MEDICAL LIBRARY ASSOCIATION

Abstracts of papers submitted [at the] second International Congress on Medical Librarianship and [the] sixty-second annual meeting of the Medical Library Association, Inc. [Amsterdam], Excerpta Medica Foundation, 1963. 128 p. (Excerpta Medica Foundation. International congress series, no.56.)

JACOBY, J., and SLAMECKA, V.

Indexer consistency under minimal conditions. Bethesda, Md, Documentation Incorporated, 1962. Various paging. tables. (United States. Air Force. Rome Air Development Center. RADC-TDR-62-426.) mimeog.

LEWIS, CHESTER M., ed.

Special libraries: how to plan and equip them. [New York], Special Libraries Association, 1963. 117 p. illus. (Special Libraries Association. SLA monograph no.2.) mimeog.

THE ORGANISATION for Economic Co-operation and Development. Paris, [1963?] 253 p. illus. map.

PHILLIPS PETROLEUM COMPANY. Atomic Energy Division

EDP procedures in technical library operations, by Hillis L. Griffin. [Washington, DC]. US Atomic Energy Commission, 1963. 86 p, illus. mimeog.

*STECKLER, PHYLLIS B., ed.

American scientific books, 1960-1962: a basic selection of scientific, technical and medical books as entered in the American Book Publishing Record. New York, Bowker, [1962.] 474 p. \$10.

SZALAI, SÁNDOR

Gépi kivonatalkészítés: elméleti és kísérleti adalékok a magyar nyelvű tudományos közlemények gépi kivonatolásának kérdéséhez [Machine abstracting: theories and experiments . . .] Budapest, [Jánszky Lajos], 1963. 69 p. tables. (Hungary. Országos Műszaki Könyvtár és Dokumentációs Központ. Időszzerű Műszaki Dokumentációs Kérdések, no.5.) mimeog.

Articles and Papers

- AGOSHKOV, M. I.
Scientific activity of the USSR Academy of Sciences for 1962. *NLL Translations Bulletin*, vol.5, no.9, September 1963, p.781-809.
- BENJAMIN, CURTIS G.
Book publishers' interests in reprographic copyright. *Library Journal*, vol.88, no.14, August 1963, p.2837-41.
- BIBLIOGRAPHY: sorting [computer technology]. *Communications of the ACM*, vol.6, no.5, May 1963, p.280.
- BOUMAN, H.
Linearly organized chemical code for use in computer systems (Locus). *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.92-6.
- BUSINESS Efficiency Exhibition, Olympia, London, October 1-9 [1963.] *Office Magazine*, vol.10, no.118, October 1963, p.821-902.
- CARLSON, WILLIAM H.
The Holy Grail evades the search [information retrieval in libraries.] *American Documentation*, vol.14, no.3, July 1963, p.207-12.
- CLARKE, DESMOND, and FOLEY, DERMOT
Some special libraries in Dublin. *Library World*, vol.65, no.759, September 1963, p.108-13.
- DYSON, G. MALCOLM, and LYNCH, MICHAEL F.
Chemical-biological activities: a computer-produced express digest. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.81-5.
- GARFIELD, EUGENE
Generic searching by use of rotated formula indexes. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.97-103.
- GARFIELD, E., and SHER, I. H.
New factors in the evaluation of scientific literature through citation indexing. *American Documentation*, vol.14, no.3, July 1963, p.195-201.
- GLISTRUP, JØRGEN BRO
Bedriftsbiblioteker i Tyskland [Industrial libraries in Germany.] *REOL: Nordisk Biblioteks Tidsskrift*, no.4, December 1962, p.225-44.
- A GLOSSARY of sorting and merging terms [computer technology]. *Communications of the ACM*, vol.6, no.5, May 1963, p.281-2.
- GOTTSCHALK, CHARLES M., and DESMOND, WINIFRED F.
Worldwide census of scientific and technical serials. *American Documentation*, vol.14, no.3, July 1963, p.188-94.
- GOULD, ROBERT F.
Advances in Chemistry Series as a publication outlet for Divisions [of the ACS]. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.76-7.
- HIRAYAMA, KENZO
Selective and consecutively arranging triple-notch code. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.89-91.
- INFORMATION storage requirements for the contents of the world's libraries. *Science*, vol.141, no.3585, 13 September 1963, p.1067-8.
- KUNEX, JOSEPH H.
Economics of journal publication. *American Documentation*, vol.14, no.3, July 1963, p.238-40.
- KUNEX, JOSEPH H.
Economics of publishing divisional preprints. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.74-6.
- KEYS, THOMAS E.
Medical libraries and librarians in the Far East and Europe. *Steckert-Hafner Book News*, vol.17, no.9, May 1963, p.111-16.
- LAVERS, G. A.
Microfilming in the office. *O & M Bulletin*, vol.18, no.3, August 1963, p.133-7.
- LEFANU, WILLIAM R.
The First International Congress on Medical Librarianship, London, 1953. *Steckert-Hafner Book News*, vol.17, no.9, May 1963, p.109-11.
- LISSANT, K. J.
A unified method of delineating polymeric species. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.103-13.
- NOTES on the biggest conference (and maybe the best.) *ALA Bulletin*, vol.57, no.8, September 1963, p.725-73.
- ORNE, JERROLD
Resources of foreign scientific literature: acquisition on a national scale. *American Documentation*, vol.14, no.3, July 1963, p.229-33.
- PAPERS presented at the ACM Sort Symposium, November 29, 30, 1962, Princeton, New Jersey. *Communications of the ACM*, vol.6, no.5, May 1963, p.194-280.
- PELUS, SANDRA, and others
Clinical data processing: concepts in a pharmaceutical organization, by Sandra Pelus, Joel L. Shapiro and Fred Wibiralske. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.114-21.
- PORTER, J. R.
Challenges to editors of scientific journals; scientific papers should be judged for their lasting value before, rather than after, publication. *Science*, vol.141, no.3585, 13th September 1963, p.1014-17.
- PROBLEM, not Opportunity, yes! ALA's conference within a conference looks at library service to students. *Library Journal*, vol.88, no.14, August 1963, p.2829-36.

SALTON, GERARD

Some hierarchical models for automatic document retrieval. *American Documentation*, vol.14, no.3, July 1963, p.213-22.

SLAMECKA, VLADIMIR

Classificatory, alphabetical, and associative schedules as aids in coordinate indexing. *American Documentation*, vol.14, no.3, July 1963, p.223-8.

SPRENKLE, PETER M., and KILGOUR, FREDERICK G.

A quantitative study of characters on biomedical catalogue cards—a preliminary investigation. *American Documentation*, vol.14, no.3, July 1963, p.202-6.

TATE, FRED A.

The place of preprints in the chemical literature. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.77-9.

TRIMBLE, R. F.

The journals of inorganic chemistry. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.79-81.

VICKERY, B. C.

Yorkshire's national science library. *Leeds Journal*, August 1963, p.1-4.

WEIL, B. H., and others

Technical-abstracting fundamentals. 1. Introduction, [by] B.H.Weil, I.Zarembor and H.Owen. *Journal of Chemical Documentation*, vol.3, no.2, April 1963, p.86-9.

MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4d per word, minimum 5s. An additional charge of 6d is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 6 Lakeside, Ealing, London W13. ALPerion 1045.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TRANSLATIONS FROM TURKISH. All subjects. F.P.Scott, 4 Uphill Grove, Mill Hill, London NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J.Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. STAmford Hill 8564.

Appointments vacant

TECHNICAL LIBRARY in the construction and chemical engineering fields requires woman (22 to 28 years) as Library Assistant. The successful candidate will be engaged on an interesting new project in co-ordinate indexing. Experience of abstracting and indexing of technological literature essential. Interest in information retrieval, particularly co-ordinate indexing, an advantage. Ability to type own abstracts is necessary.

Write giving details to the Personnel Manager, Constructors John Brown Ltd, CJB House, Eastbourne Terrace, London W2.

THE BRITISH OXYGEN COMPANY, Equipment Division, has a vacancy in its new Technical Centre Library for a qualified or partially qualified Female Assistant. Applicants should be experienced in technical library routine. Salary will be according to qualifications and experience. Applications to Superintendent, General Services (Personnel), The British Oxygen Co., Ltd., North Circular Road, Cricklewood, N.W.2.

LEADING LONDON ADVERTISING AGENCY requires assistant Librarian (A.L.A. or Diploma); experience in cataloguing or special library work an advantage. Apply: The Personnel Officer, The London Press Exchange, Ltd, 7 St Martin's Place, W.C.2, or phone Temple Bar 2424, ext. 289 between 9.30 - 5 p.m.

SCHOOL OF LIBRARIANSHIP, NORTH-WESTERN POLYTECHNIC, Prince of Wales Road, London NW5. In September 1964, the School of Librarianship expects to appoint a number of new teachers as a major expansion of staff for its new courses. These new posts will be mainly at Assistant Lecturer and Lecturer grades, with possibly one or two appointments at the Senior Lecturer grade. Advertisements will appear in March or April 1964. Librarians who would like more information about teaching in the School of Librarianship are asked to write to the Acting Head of the School.

SENIOR LIBRARY ASSISTANT (MALE) required for the Central Technical Library of the Mullard Group of Companies situated at

the Research Laboratories. Applicants should be under 30 years of age. Preference will be given to those who have had experience in a technical or industrial library and who possess organizing ability, but younger men who are just starting their careers as librarians would also be considered. A good pension and life assurance scheme is operated by the Group. Applications should be addressed to: Dr S.A. Ahern, Mullard Research Laboratories, Redhill, Surrey.

THE UNIVERSITY OF WARWICK. Applications are invited for a post of **SENIOR LIBRARY ASSISTANT**. Duties to commence 1st February 1964. Candidates should possess a University Degree and/or appropriate professional qualifications. Salary at appropriate point on scale £750-£1,400 per annum according to qualifications and experience. Three copies of applications naming two referees, should be sent by 12th December 1963 to The Registrar, The University of Warwick, Coventry, from whom further particulars may be obtained.

Wanted

CHEMICAL ABSTRACTS, vol. 58, part II (May 27 1963). Proctor & Gamble Limited, P.O. Box Forest Hall 2, Newcastle upon Tyne 12.

FAIRMAN, SEIBERT & CUTSHALL, C. S. Graphic statics. 1932. McGraw-Hill. **HUDSON, C. W. & SQUIRE**, Elements of graphic statics. 1923. McGraw-Hill. Purchase preferred, but grateful for loan. Offers to Technical Library, British Northrop Limited, Blackburn.

For sale

Proceedings of the International Conference on the Peaceful Uses of Atomic Energy, Geneva, 8-20th August, 1955. 16 vols. Offers to: Mrs K. Bourton, Technical Librarian, Constructors John Brown Ltd, CJB House, Eastbourne Terrace, W.2. Tel. AMB 8080.

JOURNAL OF DOCUMENTATION, vol. 15, September 1959, no. 5 to vol. 19, September 1963, no. 3. **ASLIB PROCEEDINGS**, vol. 14, nos. 8-9, August-September 1959 to vol. 15, no. 9, September 1963. £5 o.n.o. to Mrs Eagle, 61 Camrose Ave, Edgware, Middx. or phone EDG 3052.

The wide field of document reproduction—photocopying, microfilming, small offset printing—was surveyed recently in a 28-page supplement to 'The Industrial and Commercial Photographer'. Copies are available at 2s 6d plus 6d postage from 'ICP', 7 Grape Street, London W.C.2. Mark order 'Copying'.

Aslib Proceedings



incorporating Aslib Information

*Semantic Factors, Role Indicators et Alia:
Eight Years of Information Retrieval at
Western Reserve University*

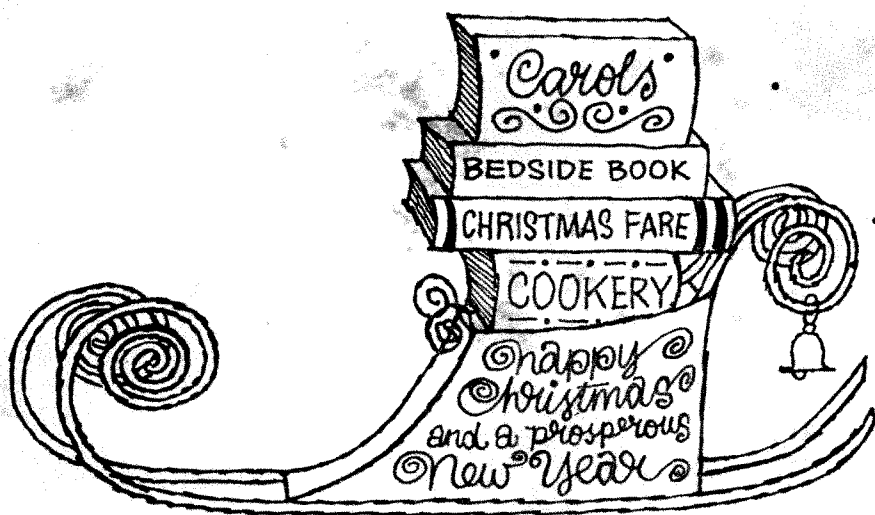
ALAN M. REES

*The Handling of Scientific and Technical Information in the
USSR: a Report on the DSIR-Aslib Visit*

W. L. FRANCIS

ASLIB • 3 BELGRAVE SQUARE • LONDON SW1

Aslib Proc. vol.15 no.12 p.343-377 London, December 1963



427

“Happy Christmases” from Blackwells

Christmas crowds are milling. Christmas posts are flooding. And Blackwells, like everyone else, are in a great big RUSH.

STILL.

They would like to stop whatever it is they are doing—and wish you a very happy Christmas. And as, last count, there were four hundred and twenty-seven people working at Blackwells, that means four hundred and twenty-seven “Happy Christmases”.

OR DOES IT?

No! Julian Blackwell has forgotten to count himself.

OH WELL.

Whether it's four hundred and twenty-seven . . . twenty-eight we hope you get the point. Which is, that all of us at Blackwells hope that all of you have a splendid Christmas and a golden New Year.

SEE YOU IN 1964.

BLACKWELL'S BROAD STREET OXFORD



ASLIB PROCEEDINGS

incorporating Aslib Information



Volume 15

December 1963

Number 12

ASLIB CALENDAR 1964

January

- TUE.7. Electronics Group visit to BBC.
- WED.8. Economics Group visit to Labour Party Library.
- TUE.14. Electronics Group visit to BBC.
- WED.15. Economics Group visit to Public Record Office.
- THUR.16. Technical Translation Group annual general meeting followed by a lecture 'The Lucas Award Scheme to encourage proficiency in foreign languages', by C. P. Auger.
- TUE.21. Evening meeting at Aslib, 5 for 5.30 p.m. 'Challenge and opportunity: Sheffield's new Postgraduate Library School', by W. L. Saunders. See paragraph below.
- THUR.23 - FRI.24. Course on the trade literature collection.
- WED.29. Economics Group visit to London Chamber of Commerce.

February

- TUE.4 - WED.5. Course on work with patents. See paragraph below.
- WED.5. Economics Group visit to London Press Exchange.
- WED.12. Economics Group visit to Westminster Bank Economic Intelligence Department.
- WED.19. Economics Group visit to Aslib.
- THUR.20. Evening meeting at Aslib, 5 for 5.30 p.m. Dr T. C. Barker on business records for the future.
- WED.26. Economics Group visit to Telex Auto Exchange.

March

- WED.4. Midlands Branch annual general meeting, Birmingham.
- WED.4. Economics Group visit to Goldsmith Hall.
- FRI.20. Scottish Branch annual general meeting and one-day conference, Glasgow.

April

- THUR.9 - SAT.11. Aeronautical Group and Chemical Group joint annual conference at Cranfield.

June

- FRI.5 - SUN.7. Electronics Group annual conference at Ashridge College.

1963 Annual Conference

The 37th Annual Conference, from 24th to 26th September, was the first to be held in Scotland. St Andrews University was an exceptionally comfortable and convenient choice. Thanks to the efficiency of our Scottish hosts, to the co-operation of the Officers and Committee of the Aslib Scottish Branch, and to the pleasant weather and the attractiveness of the town and countryside, it was an enjoyable conference in every way. Thanks are also due to the Conference Committee for the high standard of the programme. The papers presented were an evaluation of communication in information and will be published in *Aslib Proceedings*, two in January and three in February 1964.

Aslib Evening Meeting

'Challenge and opportunity: Sheffield's new Postgraduate Library School' is the title of the paper to be given at the next evening meeting, on Tuesday 21st January 1964. The Sheffield School of Librarianship is the second British post-graduate school of librarianship to be opened, forty years after the first one. Mr W. L. Saunders, Director of the Sheffield School, will describe the background to its creation, outline the plans and general policy, and speak of hopes and intentions in the direction of education for special librarianship. He will take the opportunity, also, of describing the highlights of his recent tour of the leading American graduate library schools, and indicate what he thinks are the most significant trends in American professional education for librarianship.

The meeting will be held at 5.30 p.m. at 3 Belgrave Square, and tea will be served at 5 o'clock.

Course on Work with Patents

Patents are an important source of technical information, but owing to peculiarities mainly caused by their status as legal documents they are not used as much as they should be. In most organizations patent work is dealt with by specialists, but a good understanding of patents is of great value to information officers. Aslib is therefore once again holding its course on work with patents and elementary patent law, on Tuesday and Wednesday 4th and 5th February 1964.

The lecturer will be Felix Liebesny, B.Sc., A.L.A., F.I.I.N.F.S.C., F.I.L., Librarian, the British Aluminium Company Ltd. The course is intended for people whose work is concerned with the administration and exploitation of patents, and will not deal with detailed aspects of patent law. The fee for the course will be 6 guineas. The programme is given on a leaflet enclosed with this issue, and applications should be made to the Education Officer, Aslib, on the form supplied with it.

Aeronautical Group

Over fifty people attended the Winter Meeting of the Group held on 8th November. Mr Cyril Cleverdon gave a very interesting account of his visit to the USSR. The afternoon paper by Mr Davies of IBM United Kingdom Ltd, on the KWIC indexing system, was followed by a demonstration with the IBM

1401 and 7090 computers. The meeting concluded with a sherry party at the Royal Aeronautical Society, when the Hargrave Papers, which have been in the Society's possession since 1920, were officially handed over by Professor A. R. Collar, President of the Royal Aeronautical Society, and accepted by Sir Allen Brown, Acting High Commissioner for Australia, on behalf of the Museum of Applied Arts and Sciences in Sydney. The Hargrave Papers form a collection of notebooks, drawings and documents by Lawrence Hargrave, a pioneer in aeronautics.

Biological Group

At the Group's first conference on 11th October the speakers described some work in progress on research tools which members may like to know about. Dr Charles Shilling, Director of the Biological Sciences Communication Project, said that a list of world aquatic biology journals is being distributed to 745 marine biological stations, with a request for their suggestions as to accuracy and completeness. The BSCP proposes to maintain a register of institutions engaged in aquatic biology research, based on Dr Robert Hiatt's *World directory of hydrobiological and fisheries institutions*. Other reference tools in the field are being considered and further suggestions would be welcomed. Correspondence should be addressed to the Biological Sciences Communication Project, George Washington University, Washington 6, DC.

Miss P. I. Edwards read a paper by Mr G. A. Lloyd, of the FID, on the revision of the UDC 57/59 (biology) schedules. The Committee appointed for this purpose had its first meeting at the FID Conference in Stockholm in September. Any member of Aslib who has not already joined the Biological Group or was not at the Group meeting and would be prepared to help in the revision of the biological schedules is invited to communicate with Miss P. I. Edwards, 59 Hampton Road, Teddington, Middlesex.

Film Libraries Group

The second edition of the *Directory of film and television production libraries* has now been published. The *Directory*, which is the only publication of its kind, contains information on the scope of film libraries supplying material for production purposes. It has a small section on foreign sources and also includes recorded music libraries. There is an appendix giving a sample contract for the supply of film library material. Requests for copies of the *Directory* should be addressed to Mr Harry Wynder, Hon. Treasurer of the Film Libraries Group, at 33 Sylvester Gardens, Hainault, Essex.

Aslib Cranfield Report

A report on a test of the index of metallurgical literature of Western Reserve University has recently been published as the result of an Aslib Cranfield Research Project investigation. The authors are Mrs Jean Aitchison and Mr Cyril Cleverdon.

At Cranfield, a method for testing existing indexing systems was developed as a by-product of the test on the efficiency of indexing systems, and opportunity was given for trying out this method on the Western Reserve University index

to metallurgical literature. The WRU index is compared with a faceted classification for metallurgy developed from the English Electric classification. The report is not only a test of existing systems but also a research investigation in its own right, making significant additions to knowledge of the operation of indexing systems.

The report may be obtained from Mr C. W. Cleverdon, The College of Aeronautics, Cranfield, Bletchley, Buckinghamshire, and the price is 30s.

Latin American Periodicals in the Social Sciences

A union list of serials on the Latin American economy (and the social sciences generally) is being compiled by a working party that includes members of the Aslib Economics Group. The project sprang from a meeting called at Canning House on 11th June 1963, at the invitation of Sir John Walker, K.C.M.G., Director-General of the Hispanic and Luso-Brazilian Councils, who took the chair. Mr K. I. Porter, editor of the *British union-catalogue of periodicals*, is chairman of the working party, known as the 'Committee on Latin America'.

A list of 377 serials has been compiled and this will be sent to some 150 libraries throughout the country for them to report on their holdings. The list excludes statistical serials; there have been recorded separately by the Board of Trade Library, which has very extensive holdings.

Aeronautical Glossary

One of the earliest glossaries of terms to be published by the British Standards Institution was that for aeronautical terms, BS 185, which was first issued in 1923 and was based on the work of a committee appointed by the Royal Aeronautical Society. Since then the glossary has been revised regularly. The first five sections of the latest revision were published last year, and are now joined by a further five sections (of which Section 6 is entirely new). They are:

- Section 6 Ballistic and guided missiles
- Section 7 Lighter-than-air aircraft
- Section 8 Power plant
- Section 9 Propellers
- Section 10 Auxiliary services

A complete alphabetical index to Sections 1-10 is now available. Copies of BS 185, Sections 6-10, complete with revised index, may be obtained from the BSI Sales Branch, 2 Park Street, London W1, price 25s. Sections 1-10, with index, are also available at 55s each. (Postage will be charged extra to non-subscribers.)

Rutgers Seminars

The first of the Rutgers Seminars on the intellectual organization of information was held at Rutgers, the State University, New Jersey, on 31st October and 1st November. Mr J. Mills of the North-Western Polytechnic and the Aslib Cranfield Research Project presented the UDC: the Panel consisted of Ben Custer, Editor of the Dewey Decimal Classification, Dr Phyllis Richmond of the University of Rochester, Malcolm Rigby, Editor of Meteorological and Geo-astro-physical Abstracts, Dr Maurice Tauber of Columbia University Library

School, and Dr Harold Wooster of the Air Force Office of Scientific Research; the moderator was Dr Susan Artandi of Rutgers.

Two more seminars in the series have been announced. Dr J. C. Gardin, Director of the Section on Automatic Documentation of the French National Centre for Scientific Research, will cover his own system, SYNTOL (Syntagmatic Organization Language), on 5th and 6th December. The panelists on this occasion will include Dr John O'Connor of the Institute for Scientific Information, Dr Harold Wooster of the Air Force Office of Scientific Research, and Dr Victor Yngve of the Massachusetts Institute of Technology; the banquet speaker will be Dr Mortimer Taube of Documentation, Inc. At the third seminar, 12th and 13th March 1964, John Metcalfe of the University of New South Wales will present Alphabetical-Subject Indexing.

Documentation Systems

Documentation systems: a structural outline is the title of a booklet recently published by the Rutgers Graduate School of Library Service and compiled by Dr Theodore C. Hines. Dr Hines was until recently principal investigator for the Rutgers Seminars and has prepared this outline as the basis of the seminars. It is designed to afford a common framework within which each system (such as UDC, Alphabetical-Subject Catalogue) can be described, thus facilitating comparison of any particular feature as it affects each different system, for example, types of material for which it is particularly suited, or not suited; the search method; the search output, and so on.

The outline is in considerable detail and is designed to accommodate descriptions of every kind of system, from UDC to completely mechanized systems. Inquiries about the booklet should be made to Graduate School of Library Service, Rutgers, the State University, New Brunswick, New Jersey, USA; a copy may be seen in Aslib Library.

Bibliography of Machine Translation

The National Bureau of Standards has issued *A bibliography of foreign developments in machine translation and information processing*, by Josephine L. Walkowicz (NBS Technical Note 193, 10th July 1963). It lists 714 references to the literature translated in the series *Foreign developments in machine translation and information processing* put out by the US Department of Commerce, Office of Technical Services, Joint Publications Research Services. A permuted title index is included as well as a conventional subject index to enable the comparative efficiency of the two methods of indexing to be studied. An author index, an index to conferences and organizations cited, and a list of the original source documents are also provided. Copies of the bibliography may be obtained from the Superintendent of Documents, US Government Printing Office, Washington 25, DC, price \$1.

Printing for the Crown

The 'design policy' article in the November issue of *Design* is an essay by Ruari McLean entitled 'Printing for the crown'. It gives a lively and informative

account of the work of the Typographical Design and Layout Section of Her Majesty's Stationery Office, and of the developments in Government printing standards. There are excellent illustrations. *Design* is published for the Council of Industrial Design by HMSO, price 3s 6d a copy.

Statistics Library

The Board of Trade has issued a booklet describing the resources of its Statistics and Market Intelligence Library, which is now in the new building at 35 Old Bailey, London EC2. The reading room is open to the public from 9 to 5.30 on Mondays to Fridays, and a comprehensive collection of statistical publications from all over the world is available for reference. Typewriters and adding machines are available, or photocopies can be supplied. The library also holds a large number of international and foreign trade directories, and a growing collection of foreign trade catalogues. The information available from the library is supplemented by the other services of the Export Services Branch in the same building.

Sira Open Days

The British Scientific Instrument Research Association (Sira) is opening its laboratories to visitors from member firms and other organizations likely to be interested in the Association's work. Visiting days will be once a month and details may be obtained from the Secretary, Sira, South Hill, Chislehurst, Kent.

Course on Monopolies

A course on the law of monopolies is to be held at Battersea College of Technology in the New Year. The course will consist of seven lectures, to be given on Thursday evenings from 6.45 p.m. to 8.30 p.m., beginning on 30th January. The syllabus will include restrictive covenants, trade secrets, the effect of the Monopolies Act, and other related subjects. Further information may be requested from Dr R. Douglas, Lecturer in Law and Government, Battersea College of Technology, London SW11.

NEW MEMBERS

CORPORATE

<i>Name</i>	<i>Locality</i>	<i>Representative</i>
Airflow Developments Ltd	High Wycombe	A. Connor Wilson
Beaumont, F. E., Ltd	London	M. Beaumont
Centro de Documentação Científica Ultramarina	Portugal	Dr Z. F. Paulo
Cornwall Technical College	Redruth	H. S. Hoptrough
C.T. (London) Ltd	London	P. M. Green
Department of Mines & Technical Surveys	Canada	Miss M. M. Rice
General Refractories Ltd	Worksop (Notts)	M. G. Sutherland
R. S. Gothard & Company Ltd	Marlow-on-Thames	R. S. Gothard
Hindustan Steel Ltd	London	E. L. C. Coppieters
Houldsworth School of Applied Science	Leeds	Mrs Judith Murray
Imperial Aluminium Company (Wales) Ltd	Swansea	Miss Ceinwen Evans
Institute of Economics and Statistics	Oxford	J. G. Watson
Laboratorio de Engenharia de Angola	West Africa	H. N. Ferreira
Ranks Hovis McDougall (Research) Ltd	High Wycombe	A. Fewell
Research & Engineering Controls Ltd	Bognor Regis	J. S. Johnston
St Martin's School of Art	London	Miss C. Robertson
Stow College of Engineering	Glasgow	Miss M. Caldwell
Svensk Byggtjänst	Sweden	I. Karlen
Time-Life International	London	Miss Margaret Skea
University of Lancaster	Lancaster	A. G. Mackenzie
University of the West Indies	West Indies	Mrs S. Barrow
Wimbledon School of Art	London	K. P. Carpenter
W.M.S. (Engineers) Ltd	London	Neil R. Wallis

INDIVIDUAL

<i>Name</i>	<i>Locality</i>
Billig, Dr E.	Esher
Bryan, S. H.	London
Nicholson, D. V.	Angmering-on-Sea
Selander, E.	Sweden
Stoddart, Mrs L.	London
Vespry, H. A.	Canada
Yahuda, Mrs V.	Richmond (Surrey)

SEMANTIC FACTORS, ROLE INDICATORS ET ALIA

Eight years of Information Retrieval at
Western Reserve University

ALAN M. REES

Manager, Research Resources, and Assistant Professor of Library Science, Center for Documentation and Communication Research, School of Library Science, Western Reserve University

Evening meeting, London, 16th October 1963

I. INTRODUCTION

IT is indeed a pleasure to talk to you this evening about information retrieval in general and at the Center for Documentation in particular. Information retrieval, I suspect, is treated with some suspicion in Britain, and much of the outpouring of documentation literature is doubtless discounted as typical American excesses of enthusiasm and braggadocio. I hope that I can contribute something tonight towards putting our own efforts into a sensible perspective.

The transatlantic interchange of ideas has always been most valued by us in Cleveland, and we have greatly benefited by the visits of Vickery, Booth, Cleverdon and others. The extended sojourn at the Center by Robert Fairthorne, the wandering international troubadour, was quite an experience for us, and possibly for Robert also.

I like to believe that this current type of British-American dialogue is on a higher plane than that of a past era, and I hope you will forgive me if I dwell upon this for a moment.

In 1893 James Duff Brown visited the United States, and his impressions of American libraries are curiously interesting and appropriate to my main theme:

The labor saving idea has attained the dignity of a fetish . . . and in some instances is actually pursued at a sacrifice of time and money.

Brown thought that the ultimate aim of the American librarian was:

Let us systematize our methods, write and talk constantly about them, let us bulk largely in the public eye and impress ourselves on the public mind as a state necessity, and the upshot will be such a recognition of our professional and personal merits as will enable us to live like capitalists and even run for Congress.

Our faithful observer argued that although the British librarian lacked the 'pushing methods' beloved by most Americans, nonetheless he provided equal if not better service at a fraction of the cost. The only real novelty Brown detected was the ubiquitous spittoon or cuspidor. In American libraries 'the

staff outnumbered the readers; the women did most of the work; whilst the men took most of the credit'.¹

This type of argument was answered by a broadside which portrayed English libraries 'as a cross between a temple and a museum, the delivery clerks as tottering old Periwigs, and the librarians as 'speechless old bureaucrats who shuffle around the place in felt slippers staring resentfully at intruders who would disturb the bookworms in the dust of manuscripts'.²

This piece of criticism in turn resulted in a manoeuvring of the British library field artillery, and we note the following counter-attack:

With a few notable exceptions American librarians are a somewhat narrow-minded, self-sufficient and wilfully ignorant class of public officials. . . . They are eternally shutting their eyes to the achievements of other nations and assuming that the last word on all library matters has been spoken in America. . . . American library conditions have not made an atom of progress since 1888, save in piling up immense revenues and the establishment of unnecessary staffs which have to attempt to justify their existence by launching out into equally needless and futile enterprises.

It was concluded that:

What ails the American library invalid is simply indigestion, caused by lack of active employment and having emoluments large enough to enable him (or her more often) to eat pumpkin pie, clams, baked beans and canvas-back duck all the year round. . . . The average American library report is garnished with mingled bounce and twaddle and lots of brag and blather.³

The age of jet travel has permitted a more intensive and serious interchange of ideas between British and American workers in the vineyard of documentation and librarianship, and my talk this evening is devoted to the furthering of this worthy end.

2. ESTABLISHMENT OF THE CENTER IN 1955

The Center for Documentation and Communication Research was established in 1955 at Western Reserve University as a division of the School of Library Science. The Dean of the Library School, Dr Jesse H. Shera, with the enthusiastic support of the University administration, felt that exploration of non-conventional approaches to the analysis, storage, retrieval and dissemination of recorded knowledge offered great promise and interest. The necessity of improving the efficiency of librarianship to satisfy the complex information needs of a rapidly changing industrial society was frankly recognized. Documentation was therefore regarded as 'librarianship under pressure' or 'librarianship in a new key.' The essential unity between documentation and librarianship was the rock on which the Center was founded.

A continuing programme of development of non-conventional techniques was initiated under the direction of J. W. Perry and Allen Kent. 'Conventional techniques' in 1955 seem to have been equated with traditional classification and subject headings. These two forms of analysis were typified by the United States Patent Office classification scheme and the subject index to *Chemical Abstracts*. Since Perry was a chemist, it is not surprising that these two examples came to mind.

Perry argued that conventional classification and indexing had reached a point of diminishing returns. Classification entailed a frozen array of concepts

which, once fixed during the process of subject analysis, became in effect the framework within which it was necessary to work during subsequent searching operations. The limitation inherent in such classification schemes therefore arose from the fact that the permutations of concepts as established in defining classes and sub-classes often do not correspond to the requirements of an information search conducted, for example, to investigate the inventive novelty of a patent application. Likewise, alphabetical subject indexing represented rigid pre-co-ordination of concepts and prohibited multi-dimensional searching.⁴

In contrast, Perry held that 'by using relationships of the analytic and synthetic types . . . it is possible to conduct the encoding of an abstract in such a way that a wide range of concepts and also the relationships between them are made available as reference points for defining and conducting searching operations.'⁵

The essential point in the conventional versus non-conventional systems argument is of course related to the definition of 'conventional'. Just as Perry tended to equate 'conventional' with 'non-mechanized', he also tended to equate 'non-conventional' with 'mechanized' and assumed that a *machine* searching system was necessary to conduct searches whose scope could be defined without restriction as to combinations of concepts. Underlying Perry's argument was the desire not only for an efficient retrieval system but also for a tool for the generation of new knowledge derived from the synthesis of existing concepts. At this point in time one detects an excessive note of optimism in the statement that 'a machine searching system can extend the capabilities of human memory in the same fashion that a microscope extends the capabilities of our eyes'.⁶

I suspect that Perry considered faceted indexing as non-conventional and hoped for eventual mechanization of such schemes as the Colon classification. In 1959 Perry had some discussion with Ranganathan along these lines. The reasons for advocating mechanization in this instance are not so compelling in 1963.⁷

3. DEVELOPMENTAL ACTIVITY: METALLURGY

The first task of the Center was to establish the nature and extent of the limitations of traditional methods of exploiting recorded knowledge and to demonstrate a manner in which these shortcomings could be overcome by non-conventional techniques. A project was undertaken in 1955 to devise an information retrieval system for the American Society for Metals which would provide the maximum flexibility for the retrieval of metallurgical literature. This project led to the creation of the 'WRU system' (or rather, one of the WRU systems since developed).

This system has been described at great length elsewhere, and I do not intend to discuss it at this juncture. I will merely summarize by saying that in this particular system a telegraphic abstract is prepared for each document. The abstract consists of a set of index entries with the syntactic relationships expressed by role indicators. The role indicators are analogous to facets and represent material, process, property, product, and so on. Punctuation symbols are used to organize the concepts into levels or groupings similar to clauses, phrases, sentences and paragraphs of natural language text. Linking or inter-

fixing achieved by these punctuation levels obviates false co-ordinations of concepts at the time of searching. Telegraphic abstracts are encoded with reference to a semantic code dictionary, and in this manner semantic relationships are made explicit. Search strategies are constructed utilizing Boolean logic.⁸

The period of 1955 to 1962 witnessed the generation of a machine-searchable file of over 100,000 abstracts, creation of a semantic code thesaurus of more than 30,000 terms, development of procedures for the automatic encoding of telegraphic abstracts and consistent rules for abstracting. But above all else the experience gained in the analysis of questions, construction of search strategies and the manipulation of large amounts of indexing information by means of a computer was invaluable to the basic research which lay ahead.

Moreover, the receipt of a National Science Foundation grant in 1960 to operate a model information centre in metallurgy and cognate subject areas enabled the Center to explore the interaction of live questioners with a computerized file. The General Electric computer was delivered in 1961. The operation of the American Society for Metals Documentation Service under contract to the Society until early in 1963 also presented the Center with the opportunity of studying the design—installation—testing—pilot investigation—and operation of a computerized system. A test of the semantic code index was undertaken by Cyril Cleverdon in 1961.⁹

4. THE NATURE AND MAGNITUDE OF THE INFORMATION 'CRISIS'

Another aspect of the Center's activity (from 1955–1960) was the attempt to define the nature of the problem of the effective use of recorded information. The Center perhaps initiated more papers, speeches, symposia, reports, forums and conferences relating to documentation than any other group in the United States or elsewhere. The launching of Sputnik lent emphasis to the argument that the West was lagging behind the Soviet Union in certain critical areas of science and technology. It was argued that obsolete and inefficient techniques of handling, disseminating and utilizing information had to bear their share of responsibility. Duplication of research is costly, and it was rightly insisted that good information retrieval systems can increase scientific productivity.

A series of national conferences was held at Western Reserve University over these years to brief government agencies and the scientific-technical community on the vital necessity of devoting adequate amounts of attention and funding to the provision of improved and extended information services. These conferences were the PURK conference (Practical Utilization of Recorded Knowledge) January 1956;¹⁰ Symposium on Systems for Information Retrieval, April 1957;¹¹ Invitational Meeting to Consider a Plan for the Creation of a National Center for the Coordination of Scientific and Technical Information, February 1958;¹² International Conference for Standards on a Common Language for Machine Searching and Translation, September 1959.¹³

The PURK conference resulted in the establishment of the Council for Documentation Research, and the 'Plan for Creation of a National Center' was jointly presented by Western Reserve University and the Council in 1958.

The proposed national centre was never implemented as the solution to the overall problem of disseminating information. But each of the six objectives listed for that proposed national centre has been implemented in various ways, and the Center's activity during this period was instrumental in converging those who have since worked effectively towards implementation of the separate objectives. These objectives were:

1. To provide effective interdisciplinary information services.
2. To provide such information services as may be required to fill gaps in various fields, until such time as new agencies may be established.
3. To foster the development of new information services by existing agencies.
4. To provide advice and guidance to co-operating information centres in order to ensure economy of effort.
5. To act as a clearinghouse for information requirements that can be referred to existing agencies.
6. To foster and conduct research and development in methods, equipment and procedures in order that better services may be provided and costs may be reduced.¹⁴

The objectives listed in 1958 have been implemented in diverse and ingenious ways. Great progress has subsequently been made in the improvement of scientific communication. However, awareness of the nature and magnitude of the problem was a pre-requisite for positive and appropriate action. Western Reserve University endeavoured at an early stage to provide an open forum at a number of national and international conferences for discussion of the basic issues involved.

5. DEVELOPMENTAL ACTIVITY: MEDICINE AND EDUCATION

In recent years the Center has shifted its interest from the physical sciences to the health sciences and the social sciences. The enormous volume of medical research in the United States financed by government agencies such as the National Institutes of Health and by private foundations has resulted in complex problems of medical communication. This has been recognized by NIH. Likewise, the Office of Education of the Department of Health, Education and Welfare has felt that the expenditure of large funds on research imposes the accompanying responsibility of developing adequate apparatus for effectively disseminating the results of such research. The Center has gained additional experience in working with NIH and the Office of Education in the design and development of retrieval systems aimed at satisfying the needs of research personnel in the following areas.

a. Health sciences

In a co-operative project with the Communicable Disease Center in Atlanta, Georgia, the Documentation Center has developed a retrieval system for the literature of disease vector control and vector borne diseases, zoonoses and mycoses. A file of some six thousand abstracts has been generated (and recorded

on tape) together with a semantic code dictionary of over ten thousand terms. A number of abstractors have been trained, abstracting and coding manuals prepared and successful pilot searches conducted for staff members of the Communicable Disease Center.¹⁵

We are also involved in a detailed research study of the total requirements for a literature retrieval system in the field of diabetes. This project, sponsored by the National Institutes of Health, is carried on jointly with the University of Minnesota and the University of Rochester. Three levels of complexity of retrieval systems are being investigated: the first explores the effectiveness of retrieval utilizing the subject headings currently assigned by the National Library of Medicine for MEDLARS*; the second involves abstracting in depth by trained literature scientists from various disciplines—anatomists, physiologists, pathologists, biochemists. A number of abstracts utilizing semantic codes and role indicators have been recorded on tape for searching. The third level of retrieval system for diabetes is directed towards correlation of specific data which will be stored on tape in addition to the conventional indexing information. The most effective depth of analysis and type of information to be recorded is being determined experimentally by comparing the effectiveness of level 2 in relation to level 3.¹⁶

In connection with the diabetes programme an associative memory is being developed by Goodyear Aircraft and Remington Rand with partial support from this grant. It is anticipated that use of an associative memory could perhaps obviate the necessity of fixing permanent codes to the terminology of abstracts at the time of input. Instead, the abstracts could be stored in natural language on tape and compared at the time of search with the *latest* version of the code dictionary, or thesaurus, stored within the memory. Thus the dictionary could change with changing concepts. Each sub-discipline could even have its own dictionary. Other potential uses for the associative memories include aids to construction of classification schemes and search strategies.

A less dramatic but immediately useful product of the diabetes project is a comprehensive bibliography of 2,500 diabetes-related titles selected by a committee of experts from the 1960 cumulative *Index Medicus*, which has been produced at the Center utilizing the GE-225 and its high-speed printer. Citations are arranged by authors and keywords in title and have been printed as a special issue of the journal *Diabetes*.¹⁷ Subsequent issues of this computer-produced index will cover the years 1961 and 1962. These issues will be followed by a current awareness service of diabetes-related titles to be published monthly in *Diabetes*.

The Center has also been permitted to engage in developmental research into the problems of information handling in other subject areas of medicine under the terms of a co-operative NIH grant to the WRU medical school for the support of a biomedical computer facility. The Center provides laboratory and consultative facilities for medical school faculty who wish to pursue research in information retrieval. From one such study a system has been developed for retrieval of information in pathology. I will refer to this again in more detail.

* Medical Literature Analysis and Retrieval System.

b. Social sciences

We have been working under contract with the US Office of Education toward the development of a mechanized retrieval system capable of storing and retrieving documents relating to educational research. During the period 1961 to 1962 the Center indexed a pilot set of four thousand educational research reports, two thousand of which related to the newer educational media such as teaching machines, audiovisual media, etc. Utilizing our own experience in other fields and the experience of others who have indexed the literature of this field, the Center modified existing techniques to make them suitable for educational research literature and developed new methods where necessary. To provide means for certain aspects of comparative testing, we have applied a faceted classification as well as a telegraphic abstracting technique to all of the documents in the system. Questions were solicited from research investigators to conduct preliminary tests on the techniques developed.

Preliminary test results were promising enough for the Educational Media Branch of the Office of Education in 1962 to provide funds for the acquisition of a comprehensive file, extending back to 1920, of all media-related research.¹⁸ At the same time the Cooperative Research Branch sponsored an investigation of the effectiveness of the techniques applied in the pilot study.¹⁹ These programmes, recently completed, investigated several aspects of the problems involved in an information retrieval system for education.

For the next eighteen months the effectiveness of the system will be tested with the co-operation of a user group of twenty leading researchers and educators. This work is chiefly aimed at the refinement of techniques and investigation of user needs.

The first results of the Center's activity in developing and testing an information retrieval system for educational materials are available in a comprehensive 300-page report entitled *The library of tomorrow—today* issued in 1962.²⁰

6. PRESENT RESEARCH

Up to this point we have been discussing the Center's developmental activity leading to the establishment of files, methods and data which can now be subjected to more basic investigation. We were forced, so to speak, to build our laboratory and accompanying equipment and to labour in it to gain experience. We are now in a more interesting phase of activity—the search for theoretical principles which alone can give meaning to information retrieval. Up to the present time, information retrieval has been largely empirical and technological, and the limitations of this are only too obvious.

Our present approach to information retrieval is systems-oriented. It involves a cycle consisting of statement of problem, construction of model, design of experiments, testing of model, re-statement of problem on basis of experimental results, modification of model, further experiments and so on. A systems team has been established to provide multiplicity of viewpoint and the necessary subject background in a number of diverse areas. The team consists of several library-oriented personnel, a mathematician, linguist, medical researchers including a biostatistician, a computer engineer and so on.

We have made progress toward defining an information retrieval system and its component elements. A number of hypotheses and related models have been formulated for testing. A series of experiments is in the design stage, and it is anticipated that their results will be available in the near future. Our hope is that the systems approach will yield valid data which will permit the development of a unified theoretical treatment of information retrieval systems as a whole and not just of component elements within the system.

The novelty of our activity lies both in the method of investigation and in the hypotheses being tested. We are extraordinarily careful that our models conform very closely with problems in real retrieval situations.²¹

The recent receipt of a grant from the National Institutes of Health to establish a Comparative Systems Laboratory has permitted us to apply the systems method and to initiate the design of experiments.²² One of the important problems in comparative testing is of course to identify and control variables. We are first considering the indexing variable in retrieval systems. The following three factors will be investigated:

1. The sensitivity, specificity, effectiveness, efficiency and performance of indexing languages.²³
2. The extent to which devices built into an indexing language such as role indicators, thesaurus, interfixing, etc., contribute to sensitivity, specificity, effectiveness, efficiency and performance.
3. The consistency with which the indexing language is applied by indexers to documents.

In each experiment, user evaluation of system output will provide data with which to assess sensitivity, specificity, efficiency, effectiveness and performance.²⁴ I will describe one experiment in some detail by way of illustration.

This experiment considers variability between indexing languages. The method is as follows. An experimental file of six hundred documents has been selected from an admissible subset of our total Communicable Disease literature file. Telegraphic abstracts originally made from English language abstracts written for the *Tropical Disease Bulletin* are already on magnetic tape; a further set of telegraphic abstracts will be prepared from the source documents, and from the titles alone, of these documents. A keyword index will be prepared from the titles of the documents, utilizing a computer programme developed for Diabetes Related Literature Title Indexing Service. The subject headings for the same documents as previously assigned by the indexers of the *Tropical Disease Bulletin* will also be used for testing.

Questions to be searched will be a random sample derived from a set of questions to be submitted by a user group consisting of experts within the field of communicable diseases. Procedures for question analysis and construction of search strategies will be held constant for all indexing languages. The user will assess a search output consisting of the union of the three outputs obtained from the searching of the three indexes. Output will be assessed by the user as pertinent, peripheral or non-pertinent. Comparative sensitivity, specificity, effectiveness, efficiency and performance will be derived by statistical evaluation.

Other experiments will test the between-file variability of a particular indexing

language; variability amongst indexers in the assignment of subject headings and in the quantity of subject headings selected; variability due to the format of document indexed (abstract vs. title vs. full text as the base for subject analysis); variability as related to the format of output-assessment by the user of systems output on the basis of *i*, title, *ii*, abstract, *iii*, full text.

We will also test the effect of the structural elements of an indexing language to determine the influence of such devices as role indicators, semantic code thesaurus, interfixing and the like—again in relation to systems output as assessed by a user group with the results being subjected to statistical evaluation. A manual search of the test file of six hundred documents will be compared with a machine search of the same subject headings as recorded on magnetic tape. Moreover, we intend to superimpose the semantic code on to subject headings to determine whether the provision of semantic relationships improves performance.

So far I have spoken of the work which will be undertaken as Phase I of our Comparative Systems Laboratory. Phase II will consider other elements of a retrieval system such as question analysis, search strategy and so on.

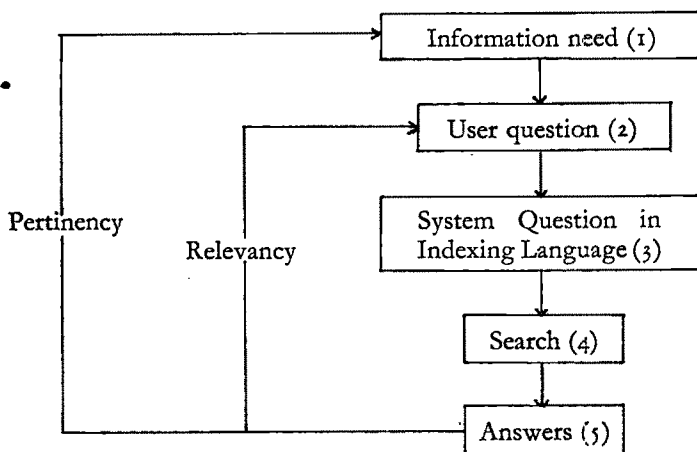
Before discussing some of our more general interests I do want to mention one particular research investigation in connection with our education files which we are testing with the co-operation of a user group which we convened in Cleveland early in October. This investigation involves the nature of the evaluation process with respect to relevance and non-relevance judgements. We are interested in the variation amongst evaluators: the user himself; 'naive' evaluators who perform system tasks such as indexing, question analysis and so on; expert evaluators (subject experts who are academic peers of the users). Second, we wish to determine the density distribution of answers in a search output as evaluated by the user and the 'probing time' required to identify a relevant answer (i.e. how many documents have to be examined in a search output before a relevant answer is found). Experiments will also be conducted to isolate the effect of variables affecting relevancy which are external to the system (such as institutional affiliation of author, date of publication, source of publication, etc.).

The concepts of relevancy and pertinency are critical to this study. The difference between relevancy and pertinency is that relevancy is a property which corresponds to a question, while pertinency is a property which corresponds to a need. Relevancy is associated with the relationship between a document and a question, whereas pertinency is associated with the information need of which the question is a formal representation. The degree to which relevancy and pertinency coincide can be considered as a measure of the questioner's ability to represent his need in terms of a formal statement, the skill of the question analyst and the effectiveness of the indexing language.

The relationship of relevancy and pertinency to search output can be seen in the diagram on page 359.

It has been assumed that the principal problem involved in searching questions is related to the transformation 2→3. Cleverdon has shown that the matching of words in question with concepts in indexing language on the correct generic-specific level and the inclusion of all validity related concepts is essential in the

optimizing of relevancy-recall scores.²⁵ However, we do not believe that the performance of a system can be gauged by the ability to retrieve relevant answers as related to the *wording* of questions. A gap exists between what a person *says* he wants and what he *actually* wants. Investigations leading to a reliable correlation of pertinent with relevant answers will provide some measurement of the system's ability to provide the user with pertinent answers.



This distinction has a vital bearing on the testing of indexing languages, since if the transformation $1 \rightarrow 2$ is not successfully accomplished, then it matters little how effectively transformation $2 \rightarrow 3$ is achieved or how discriminatingly the indexing language performs, if the purpose of the system is the provision of pertinent material. However, it may not be realistic to penalize the system for failing to provide pertinent material if it retrieves relevant documents. It is in this connection reasonable to suppose that a significant difference exists between the descriptive languages used to characterize the subject content of documents and languages used by questioners to query files.

The language of questions represents in many cases an attempt to *form* and *define* concepts. The very asking of the question is occasioned by the desire to establish with more precision the conceptual framework underlying the question. The question is asked, therefore, in order to *define* the question. If the question were capable of adequate definition, it would not be asked. But indexing languages as presently constructed are not adequate to meet the demands placed upon retrieval systems by questioners desiring help in hypothesis formation, nor in relation to invention and constructive problem solving.

The performance of an indexing language is therefore related to the type of question asked. And it follows that a higher performance can be expected with respect to questions representing a convergence on readily recognizable concepts rather than a groping towards emerging concepts—hypothesis testing rather than hypothesis formation.

Question analysis can of course assist in concept formation since such

formation can be aided as much by the identification of relevant concepts contained in the indexing language as by the retrieval of the information indexed. Moreover, assistance provided by the question analyst to the questioner in concept formation can contribute to the more successful transformation 2→3 (user question → system question). But we need to know more about why people ask questions, the process of question conceptualization, types of questions, the language of questioners, and so on.²⁶ Psychological experimentation may offer some assistance in this connection. With such knowledge it would be possible to design indexing languages to mirror the nature of the question asking process rather than to transform the verbalization of a question into an indexing language far removed from the motivational environment of the questioner.

Dr William Goffman, in a grant from the Air Force Office of Scientific Research, has been exploring the use of a metalanguage which would permit indexing at several levels of description in characterizing the content of documents. The indexing language should contain at least as many languages as the document. In this manner it would be possible to move from object language to the requisite level of description in which contexts are defined within the system for the questioner. Dr Goffman is at present engaged in the design of experiments along these lines.

I have talked at great length without arguing computerized versus manual information retrieval. I have saved this for the end. Before tackling this topic I would like to mention two interesting applications of a computer to information retrieval.

The first is a project under the direction of Mrs Jessica Melton, Assistant Director of the Center, with National Science Foundation support.²⁷ The investigation aims at achieving fully automatic processing of previously generated conventional abstracts (from the metallurgy section of *Chemical Abstracts*) for information retrieval. The procedures call for taking the format of a printed text and automatically processing it to a machine readable form above straight dictionary lookup. Flexowriter tape is being used for input of text, and programmes have been written for structuring this text to act as an index. To achieve this, all the words of the running text are classed according to a rationale of metallurgy indexing developed over the years at the Center. The analysis of the text is performed sentence by sentence and is based on the co-occurrence of classes within a sentence. The analysis thus is not purely grammatical. Recourse to grammar is made only when the construction of the sentence necessitates it. The problems to be explored in this investigation are: can partial use of grammar be made in a systematic way without total grammatical analysis, and, if so, will this system be effective for information retrieval?

The second application involves the use of the computer for direct inputting of the subject content of pathology protocols. This system, developed by Mrs Melton and Dr Chandler Smith of the WRU Institute of Pathology, eliminates the indexing process. Document description, as it is customarily written by a pathologist, is typed on to paper tape and the encoding performed by the GE-225 with reference to a dictionary stored in memory.²⁸

I think that I have said enough about our present research activities and our attitude towards the basic problems in information retrieval—testing, relevancy, pertinency, indexing languages, question analysis and so on. I can now conclude by taking the skeleton out of the closet—the computer.

7. CONCLUSION

I can end in the same refrain that I began. The Center was established in 1955 to improve the engineering efficiency of librarianship in face of the greatly accelerated demand for access to recorded knowledge. As Dean Shera pointed out early in 1956:

Machines offer some hope . . . but the problems that confront the documentalist-librarian are not to be solved by gadgets alone, nor will automation be the only answer. There must be much extensive study and experimentation in such areas as classification, cataloging, indexing and abstracting.

Continuing in the same vein, the Dean pointed out that 'whether the future will really bring the "push-button" library cannot yet be foretold'.²⁹

It was therefore clearly spelled out that research in documentation was directed towards improving the efficiency of librarianship. In this lies the clue to our thinking in relation to the computer. The use of a computer has nothing to do with the effectiveness of a retrieval system. The issue is rather one of the relative efficiency in terms of time, costs, etc., and this will be determined eventually as the result of systems analysis and experimentation to yield valid data. So far the claimed advantages of computers in information retrieval have been neither proved nor disproved. We still do not have adequate insight into the component elements of retrieval systems, the variables operating within these elements and the interaction between variables. We still do not therefore know the nature of the tasks which we are asking the computer to perform. I suspect that with increased insight into indexing languages and question languages computers will be more useful in mapping associations. There are *many* potential applications of computers.

The Center is still exploring the relationship between conventional and non-conventional methods. We no longer equate the words 'non-conventional' and 'mechanized'. It is our belief that the place of the computer will be determined experimentally and not by hot debate. Meanwhile, machine literature searching necessitates a formalization of library processes, and this sheds much light on processes performed artistically by humans. We expect to see a greater precision in the practice of librarianship. In this connection the Center is currently offering eight courses in documentation which we like to believe serve to enrich the library school curriculum.

I hope that my talk has indicated the main trends of our growth and present activity.

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DISCUSSION

Mr A. H. Holloway (Admiralty Centre for Scientific Information and Liaison) and Mr Cyril Cleverdon (Aslib Cranfield Research Project) asked for definitions of 'effectiveness' and 'efficiency' as used in the WRU experiments. (These appear in the printed text of the paper and were not given in the oral presentation. See reference 23 above.)

Mr Jason Farradane (Northampton College of Advanced Technology) argued that the user must learn the indexing language of the system. Tests of any reasonable validity must be based upon the question as asked and not on what the user thinks he wants or really needs. Mr John R. Sharp (British Nylon Spinners Ltd) commented upon the speaker's statement that if a question could be perfectly formulated it would eliminate the need to ask it. Did this mean that the perfect formulation of a question is its own answer? And could information be generated spontaneously in this manner without reference to a retrieval system? Mr C. W. Hanson (Aslib) cited an instance where a search for information might very well lead to retrieval of a hundred or more documents all relating to the topic requested. Would all of these documents be regarded as pertinent in view of the fact that the inquirer would almost certainly refuse to look at more than three or four documents?

In reply Mr Rees stated that tests based upon matching the formal representation of a question assessed relevance only, whereas probing the information need and bringing the statement of the question into greater coincidence with the underlying need permitted the retrieval of pertinent documents. In an ideal system relevance closely approximated pertinence in search output. Accepting a question at its face value tested only the capacity of a system to match the wording of a question and not the information need. In many instances only a few documents were needed, and this selection could only be arrived at by probing the motivation of the questioner. In this manner a hundred or more documents could be avoided in favour of a few pertinent documents (i.e. of value to the questioner).

In answer to Mr Sharp, it was indeed conceivable that a highly developed indexing language could generate answers independent of any searching. Perhaps two languages were needed: one to define the question and another to characterize the file.

THE HANDLING OF SCIENTIFIC AND TECHNICAL INFORMATION IN THE USSR

A Report on the DSIR-Aslib Visit*

W. L. FRANCIS, C.B.E., PH. D.

Director, Grants and Information Divisions, Department of Scientific and Industrial Research

Evening meeting, London, 22nd October 1963

THE CHAIRMAN, MR L. W. WILSON, Director of Aslib, said that about three years ago a deputation of three librarians was sent to study libraries in the Soviet Union. The deputation had reported at an Aslib winter meeting. Arising from the visit of Professor A. I. Mikhailov some time ago, it had been decided to send a deputation to study scientific and technical information centres in Russia, and this took the form of a joint Aslib-DSIR party. Dr Francis would give an introductory résumé of their findings, after which it was hoped that the audience would ask questions and the other members of the party would join the discussion.

DR W. L. FRANCIS, C.B.E., said that the visit had been one of a number which were being arranged between the Foreign Office and the USSR State Committee for the Co-ordination of Scientific Research to study technological and scientific problems. The party had consisted of himself, Mr D. V. Arnold of ICI Heavy Organic Chemicals Division, Mr C. W. Cleverdon, Director of the Aslib Cranfield Research Project, Mr R. Sewell of the United Steel Companies, Dr D. J. Urquhart of the National Lending Library for Science and Technology, and Miss M. F. Webb of the Patent Office Library, all of whom were present and prepared to take part in the discussion following his talk. Mr T. Garrett, the Scientific Attaché in Moscow, who was also present at the meeting, had accompanied the party on some of their visits. The party had studied a wide range of activities in the Soviet Union, including the preparation, publishing and dissemination of scientific and technical information to research and industrial audiences.

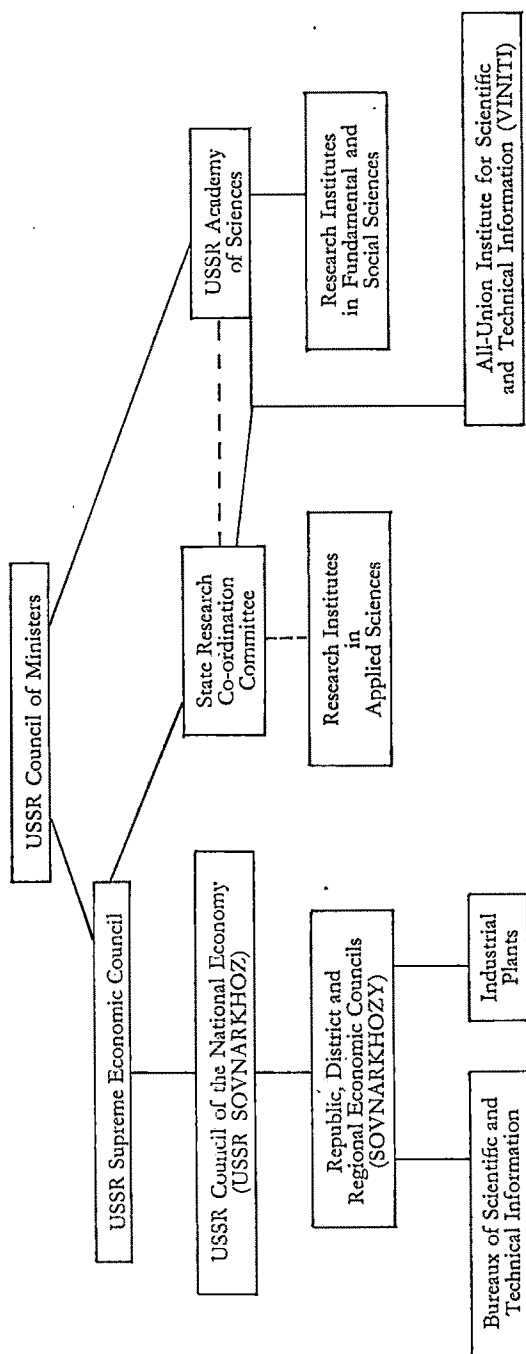
Dr Francis outlined some of the main agencies in the USSR concerned with scientific research, its application to industry and the dissemination of information (see diagram).

He emphasized the chain of ministerial control and the centralization of control over all scientific and documentation activities.

* A full report on this visit will be published in due course by DSIR. The publication date will be announced in a future issue of *Aslib Proceedings*.

CHAIN OF RESPONSIBILITY FOR SCIENTIFIC AND TECHNICAL INFORMATION

(For more detail, see DSIR Report USSR no. 24)



Notes—i. Research institutions in applied sciences are usually directly subordinate to ministries or state committees other than the Co-ordination Committee.

ii. The dotted lines imply collaboration or supervision of certain aspects of the work, rather than direct subordination.

The two most important national bodies from the point of view of scientific and technical information were the Academy of Sciences and the State Committee for the Co-ordination of Scientific Research. The second of these co-ordinated all research applied to industrial ends. The USSR Academy of Sciences was responsible for a whole series of research institutes in the fundamental and social sciences. The Academy of Sciences and the State Co-ordination Committee were jointly responsible for the All-Union Institute for Scientific and Technical Information—VINITI.

Seventeen different visits in a fortnight could only be in the nature of reconnaissances. At some places, often owing to shortage of time, the party was not able to obtain all the information it wanted; Dr Francis felt that it would be worth while for a smaller party, three at the most and preferably Russian-speaking, to spend longer periods at the more important centres so as to make more detailed studies. As examples he quoted the work being done on the use of equipment for information retrieval, the use of computers for machine translation, and mechanical translation generally.

In the beginning the party visited the State Co-ordination Committee and VINITI. Subsequently they visited seven or eight centres concerned with technical information, three of which were industrial plants and two of which dealt with patents. The party visited two publishing houses—the Publishing House of the Academy of Sciences and the State Publishing House for Engineering Literature. They visited the State Public Scientific and Technical Library in Moscow, the Lenin State Library in Moscow, the Academy of Sciences Library in Leningrad, and the Moscow State University Library.

The party's main impression was that there was a tremendous interest in scientific and technical information and a great sense of urgency about it, both in communicating it to industry and in publishing it for the benefit of scientists. Plans for encouraging authorship, promoting the use of libraries, co-ordinating publishing policy for books and journals, preparing abstracts, organizing technical information bureaux—both in the *sovnarkhozy* and in industrial plants—were being energetically carried through. They were not, however, in a final state and the party was several times told that big changes might well be made soon, especially on the technical side.

The State Co-ordination Committee was a very large government department with many co-ordination functions in different branches of research. For information activities it had a headquarters department of about thirty. The Committee laid down a definite policy for research institutes and industrial plants. Every industrial plant had to have a library and technical information centre. Every research institute had to have a technical library and technical information bureau.

The party had inquired specifically about the way the Russians dealt with small and medium-sized firms, since in the United Kingdom these were difficult to cater for. Soviet policy is to amalgamate in order to produce decent-sized organizations. The Russians for example had carried out amalgamations of shoe factories in the Leningrad area and had insisted that the amalgamated units specialize: instead of making complete shoes or boots, each factory now produced parts of shoes, such as soles and uppers, which were then assembled

to make the complete article. Having insisted on the creation of larger units, the Russians ensured that the large units had suitable libraries and information bureaux.

The three industrial plants visited were the Synthetic and Artificial Fibres Combine at Klin, the First State Ball Bearing Plant, and the Nevskii Engineering Works at Leningrad. In each case the library and information units were very efficient. They were about the same size as those at corresponding plants in Britain and seemed to operate in the same way.

From the State Co-ordination Committee and the Moscow Sovnarkhoz the party had gained a rather different impression of how the information chain was supposed to work from that gained on their visit to the firms. On their visit to the Sovnarkhoz, which was in the nature of a headquarters, they were told that great importance was attached to the dissemination of technical information which had originated from work in industrial plants. All industrial plants were required to pass information on to the Sovnarkhoz on advances, improvements in production, and any technical development which improved productivity or made automation possible. All innovations passed to the central regional sovnarkhozy were vetted by engineers, and the pick of them were passed down to all plants in the region and sideways to other regions. The information was centrally co-ordinated and controlled. Competition between firms did not arise, because they all worked to a centrally established target. Apart from being concerned with innovations, the sovnarkhozy were also partly propaganda and publicity organizations.

At the three plants, the party hoped to learn how much use an efficient technical information library at an industrial plant gained from information supplied by the sovnarkhoz. On being pressed, the plants gave the answer that some suggestions received from the sovnarkhoz were useful and some were not; if they wanted up-to-date information they tended to get it direct from the research institutes serving their industry. A plant knew that it would get technical engineering information from the sovnarkhoz channel, but if it wanted more scientific information or research material it did not expect it from that channel; it went to the research institute, the appropriate specialist library, or to the abstract journals prepared by VINITI.

They paid interesting visits to the Institute of Information of Patents and Inventions and to the All-Union Patents and Technical Library, both of which are in Moscow. The former was the only place where the party had been allowed to see the use of machinery for the retrieval and printing out of information. It was not highly sophisticated, but it seemed to be practical and useful. The machinery used was partly French and partly Russian.

At VINITI the party heard much about the interest there in information retrieval and machine translation. However, it had not been possible to arrange visits to places where the work was taking place or to talk to people concerned.

The party were told at VINITI how the staff organized and produced their *Referativnyi Zhurnal*. This was a substantial part of their work, about 700,000 abstracts a year. VINITI had also started to run instruction courses for information scientists. A good partnership had been arranged between VINITI and Moscow University. The Director of VINITI—A. I. Mikhailov—was also

Professor of Information Sciences at Moscow University. Having experimented with courses at VINITI, the Professor was trying to arrange for them to be transferred to the University Department so that there would be courses in the use of scientific literature as an integral part of the five-year training course for people taking their first degrees. There would in due course be post-graduate research training and research projects up to Ph.D. level.

Dr Francis believed that we should try to do this in our universities. Dr Urquhart had begun to give short courses on the use of literature at the NLL. This would have an impact on research students in various post-graduate scientific departments. British universities with centralized scientific libraries could profitably send one or two people to Russia—if not to take a course, at any rate to spend several weeks at Moscow university studying how it worked in practice.

The party went to see the Academy of Sciences Publishing House and the State Scientific and Technical Publishing House of Engineering Literature (MASHGIZ) and learnt how they set about drawing up their programme and how they got authors to write books. The party noted that the Russians seemed to produce many scientific and technical books compared with the United Kingdom but proportionately not so many scientific journals. A tight co-ordination of publication policy prevented people starting up unnecessary scientific journals.

The party had been interested in how the Russians set about getting up-to-date monographs written comparatively quickly compared with what was achieved in the United Kingdom. Each publishing house had a forward plan. It decided that it would publish books on certain subjects and declared itself open to offers from authors to write books on those subjects. When the forward programme became known, if the research institutes thought they had the right author they could tell him to write the book and to do so in official time. If he did it in official time he was not paid extra. If a scientist was an expert in a subject and wanted to write a book, he could either write to the publishing house offering to do so and send in a synopsis, or he could write the book and send in the text. If it was the type of book they wanted, he might be lucky and have it accepted. If he had written it in his spare time, he would be paid for it. The party had gathered that he would be handsomely paid. As a general rule the younger and more enterprising he was, the more he was paid in relation to his salary. For example, someone in his twenties who had done research for some years and who had written a monograph could be paid a figure comparable to his annual salary. His authorship of the book could help towards his candidature for a Ph.D. The older and more distinguished an author was, the less in proportion to his salary would he be paid for writing a book in his own time. If he were very distinguished, he might not be paid anything.

The publishing houses visited tried to be financially self-sufficient, taking into account everything they published—the same as British publishing houses. The Academy of Sciences Publishing House had large orders for popular classics which sold in hundreds of thousands. This helped the Academy to finance more erudite books.

The party had visited some libraries but had not been impressed by any

modern techniques or mechanization in them. These libraries, like those elsewhere in the world, were often in old buildings. Except for the Moscow University Library, they seemed to have no incentive to alter the layout or use other aids to speed the work. This was due partly to the extraordinarily high level of staffing in Russian libraries. They had about four times the staff that a comparable library in Britain would have. This might be a temporary phase in their education and allocation of manpower policy, but they appeared to be producing librarians and allocating them to libraries without regard to the economics of employing them. However, there was no surplus labour in the libraries and information centres at the industrial plants visited. At industrial plants the technical information bureaux and libraries were very closely integrated with the engineering staff. The chief engineer knew exactly what the library and information department was doing and ensured that it did the right thing. He presumably saw that it was not over-staffed.

In closing, Dr Francis invited questions from the audience.

DISCUSSION

Mr J. R. Stocks (Shell International Petroleum Co. Ltd) thanked Dr Francis for his interesting talk. He said that Dr Francis had stressed that the organization of technical information units in industry was deliberate planning. Did Dr Francis know whether any formula had been developed to decide what size the units should be in relation to the size of the factory served?

Dr Francis said that he did not think the Russians had a formula. In the three plants visited by the team there were fifteen thousand employees and eight people in the library and eight in the technical information department.

Mr Cleverdon said that one possible exception was an organization which they did not visit. At that place, they had been told that there were about 250 research workers with about one hundred people in the information service. However, on inquiry it transpired that their information service included all their printing, etc. The library and information staff numbered between thirty and forty. This was at a research institute, not at a plant. It was the highest ratio encountered by the team.

Mr Arnold said that the State Co-ordination Committee had told the party that it planned very carefully; it planned on size of staff. The party had been given no formula for this. At a number of plants the party had noticed a tendency for abstracting and information work to be done by engineers who were not members of the full-time information staff.

Dr Francis added that these people devoted about one day's work a week to it. At the three plants visited, the sixteen full-time workers were supplemented by many plant engineers working at it part-time. This was done deliberately to get abstracts which meant something to those who had to use them rather than to help out the staff of the information unit.

Mr Arnold said there was a pattern by which an engineer was selected from a team of engineers to visit the information centre on Saturday mornings and report back to the team on interesting information that had been received by the centre.

Dr W. E. Batten (ICI Technical Information Unit) said that he had some experience of trying to sell technical information to Russians. He had found on their part a definite desire to have the information organized for them under the technologies in which it was to be used rather than under the scientific studies in which it arose.

Mr D. Ball (Reed Paper Group) referred to the team's desire to visit a small or medium size firm. He had been able to visit a regional library and information bureau in Leningrad (Central Scientific and Technical Library of the Economic Council of Leningrad) about three years previously. He had seen it at work and had gained the impression, particularly from the librarian, that regional information bureaux were being set up by the economic councils to serve the small and medium size firm. He had been given very large figures for loans, but these, in view of the size of the staff, had to be scaled down by up to 40 per cent to equate them with British standards. Even so, they were making at least six hundred loans a week to smaller

and medium size firms. He had formed the impression that the large works had their own libraries and seldom bothered the central information bureaux, unless they were absolutely stumped. Smaller and medium sized concerns normally had a contact point. They channelled many inquiries and requests for literature direct to the regional information bureaux. The system worked and the staff was enthusiastic about it. He had also been concerned with LADSIRLAC and therefore had some background knowledge by which to judge how such a scheme might work and how effective it could be. His reaction was that the Russian scheme was effective. However, he had not visited a small firm in the USSR.

Mr Stocks said that he understood from Dr Francis that publishing houses decided the fields in which they would publish, presumably according to the need for further books in a particular field. Was this decision based on the needs of the teaching academies, or on the needs of other users of information? He did not understand how such a system could cover the results of research as these became available. If applied research was undertaken because there was a need for development in a certain field, there was presumably an immediate need to publish the results. Did such publications also go through the publishing houses?

Dr Francis said that the publishing houses had a governing council of scientists and engineers who worked in the industries and branches of education covered by the publishing houses. They also had a fairly high level of staff who took suggestions from the part-time members of the council and built up their future plans on the needs expressed by outside advisers from research institutes, universities, and plants. As to publishing results, many publishing houses published journals as well as books. They preferred their books to be based on articles that had already been published in journals and had had a good reception, as this way the books were likely to be required in large numbers.

Dr Urquhart said that more scientific and technical books were being produced in Russian than in English. It was clear that the Russians had some mechanics for making book production tick which did not exist in England. The forward book programme might cover the next five to seven years. There was, for instance, this idea: 'We must have some more books on machine tools, because of the requirements of the five-year plan'. There was much discussion in the professional societies. The engineers got together and discussed the needs of engineers. They had links with the publishing houses through the representatives on the Council. In the USSR, somebody would say that there ought to be a book on a particular subject. They would not say: 'If we produce a book on a particular subject, we shall be able to sell so many copies at a certain price and make a certain profit'. The absolute need for a book was there, and book production was not so much like that of our commercial houses, but more like that of H.M. Stationery Office which tried to work on the basis that its total income covered the total cost of its book production.

Mr Sewell said that the party certainly were not given a formula for the size of technical information units. One odd thing in the Soviet Union was that, if one asked to be told the population of a town of about the size of Harrogate, one would be told 800,000. One did not believe that it was quite as large, because there did not seem to be enough room in the town for 800,000 people. He was thinking particularly of Sverdlovsk, a large television centre in the Urals, the population of which is over three million but which certainly does not give the impression of being larger than Sheffield. The party had entered a textile works in a small town not far from Moscow. They were told that it was a fully automated textile plant with fourteen thousand people. Allowing for the difference between textile plants and steel plants, the textile plant could have been dropped into one of the largest British steel works and one would have forgotten where it was: it would have been part of the rod and bar mill. In England a works producing large amounts of steel would probably employ from seven to nine thousand, not fourteen thousand. Regarding books, he could speak only from experience of examining a number of new Soviet books on metallurgical and engineering subjects. They had produced some advanced books on electronics and metallurgy. Probably 60 per cent of the Russian books the party had seen had a strong technological bias. This was a good thing in one way, because, for instance, in the steel industry in the United Kingdom one could scarcely buy any books dealing with production techniques or the design of different products. Such books were, however, published in the Soviet Union in abundance. Most of the English books written in the steel industry fields were either on systems of mathematics or statistics, or on advanced electronics, automation and cybernetics. There were not many on the technological side. The

Russians had placed much emphasis on applied research, even at the technological level. He had recently received a book from MASHGIZ which they wanted translated into English. It was a simple book dealing with the melting of alloys, suitable for lower forms in technical schools or evening classes, but not really worth translating. The quality of Russian books could be patchy, but they were produced in great quantities.

Miss Webb said that the information staff at one factory once a year arranged a meeting with the editors of certain periodicals in order to give their views as users of the publications. This year, for example, they had suggested certain modifications, which had subsequently been carried out.

Dr Francis added that the party had come across that more than once. A point was made of confronting the producers of a journal with its users. There was in June a meeting of chemists to blow off steam about what they thought of the chemical abstracts produced by VINITI.

Professor R. S. Hutton recalled that Dr Francis, early in his most interesting talk, had said that the Russians seemed to be very library-minded. Until Aslib had got into its stride, the British had been very far behind the USA and possibly would have been very far behind the USSR. He had been very interested in what had been said about VINITI. Earlier visits to the Soviet Union had shown that the Russian abstracting system was very good. In quantity it approximated to that to be found in the USA. It had long been stated that the USSR Council of Ministers had passed a decree that within ten days of the arrival in the Soviet Union of information from abroad in a foreign language it had to be translated and passed on to interested industrial concerns. Presumably the main object was to build up a strong industrial country. They had openly said that they wanted it to be superior to that of the USA within a given time; and they were obviously collecting information—information published in journals, and leaflet and pamphlet information put out by firms—to achieve this. Had any member of the party learned anything to confirm this? If so, how was it done? It was not done solely by publishing abstract journals. Some organization would have to punch the information home to individual works, whether large or small.

Dr Francis said that VINITI produced something called in English *Express Information*. This journal, published forty-eight times a year in sixty-one series, contained full abstracts or abbreviated translations of the most important articles and patent descriptions appearing in foreign journals. The articles were published four to eight weeks after the original publication, and were thus available three to four times more quickly than the *Referativnyi Zhurnal*.

Professor Hutton asked whether the party had learned of any method of insisting that industrial concerns made use of these abstracts.

Dr Francis said that the only 'punching' was in relation to the information sent out by the sovnarkhozy. They received innovations sent up to the regional councils. The information bureaux processed them, sent them out to plants, and asked for comments within a week. If, for example, a plant received a suggestion about the safer use of an electric motor of a certain design, they had to decide if the suggestion was applicable to them and answer within a week.

Miss Webb said that she had been left with the impression that information was broadcast and not beamed. There did not seem to be any hint of an *ad hoc* service either within or for an individual company; the recipient could take his choice from the whole mass of information disseminated.

Mr Arnold commented that he had been impressed by the tremendous amount of information disseminated. In particular, there were large numbers of cover-to-cover photocopies of English and American periodicals. Surveys were disseminated. A large amount of published information was always available, but there appeared to be not the same 'punch' and feedback comparable with that for information from plants distributed via the sovnarkhozy. Although they might say that they wanted to get information out within ten days, it was obvious that they had similar problems of delay to those experienced in the United Kingdom. At one conference held at VINITI complaints had been made about the delay in publication of abstracts in the *Referativnyi Zhurnal*.

Mr Garrett said that one of the important functions of the State Co-ordination Committee was to keep abreast of foreign developments. If it thought that these could be utilized in any way in Soviet industry, it was one of its jobs to ensure that the information reached the industry concerned. If it thought that a foreign development was so useful that it would be easier to buy the licence rather than to conduct the corresponding research in the Soviet Union, it could

recommend that it be bought and the Soviet research on that topic be diverted to other channels.

Mr J. Hall (UK Atomic Energy Authority, Harwell) asked about report literature. What proportion of technological information came out in the form of reports? What proportion was unclassified and available in Britain?

Dr Urquhart said that the Russians appeared to have a much more cast-iron system of security classified information than the British or the Americans. In the USSR, security classified documents were not referred to in unclassified reports, but this often happened elsewhere. There was some report literature which was designed entirely to speed up the dissemination of information before normal publication. This was sent out quickly from research institutes to the plants specially concerned. It was not security classified.

Mrs Grace Chinnick (British Sulphur Corporation) asked whether the party had gained any impression at any level about the Russian interest in statistical matter, what they received from outside, what they did with it and what they did with their own statistics. Were they interested in production statistics from other countries? Did they produce and publish anything other than their annual surveys of production and external trade?

Mr Garrett replied that the Central Bureau of Statistics in Moscow was directly subordinate to the Council of Ministers and was responsible for producing all statistics within the Soviet Union. It published annually large abstracts of statistics running into hundreds of pages which could be bought at Moscow bookshops, but soon went out of stock. There were few references to statistics from foreign sources.

Mr K. A. Mallaber (Board of Trade) said that he ran one of the largest statistics libraries in Britain. Round the corner from the Board of Trade Statistics Library was Tass, which was one of the biggest public users of the Library. He understood from the Tass people that there were six major Tass organizations in the world—one each in London, Paris and Tokyo, and three others. Each of these Tass organizations was responsible for statistics, including amongst other things economic information, from a block of countries. The London Tass collected information on the British Commonwealth and the United Kingdom. The six Tass organizations, which were part of the Russian organization for collecting information on economics and foreign trade, were as much part of their government machine as the Central Office of Information or the Board of Trade was in Britain. The two Tass people who had visited his library recently had been very interested in production statistics from such places as the ex-British Colonies.

Mr Holloway (Admiralty Centre for Scientific Information and Liaison) asked if any impression had been gained about the number of students taking technical information courses, and where they were employed afterwards.

Dr Urquhart said that VINITI had thirty people on a three-year post-graduate course and it was proposing to employ them all. The course had physically started at VINITI but the intention was to transfer it to Moscow University. It would still be run by the Director of VINITI, who was a professor at the University.

Mr Ball asked if the party had got any impression that Soviet libraries and information bureaux were using comparatively advanced systems of indexing and cataloguing.

Mr Cleverdon felt that they were not. He had wanted to know the effect of the decision taken by the State Co-ordination Committee about a year before that libraries falling within the sphere of its responsibility must use the Universal Decimal Classification. Some large libraries, such as the Lenin Library and the Moscow University Library, were outside this decision.

The Patents Institute used punched-card equipment to produce printed-out lists of various patents in different subject fields. They took a small subject field, such as fuel pumps for diesel engines. They then constructed a differential classification. This seemed to be a fairly simple facet type classification. They assigned six subject headings to each patent within that narrow subject field.

An interesting comment had been made by the man in charge, Mr Shvarts. He said that the only difficulty was deciding on the subject headings; after that he agreed that everything was easy: one wanted either more people or more machines.

Miss Webb mentioned that she had been impressed with the work of the Institute of Information of Patents and Inventions on information retrieval. The differential classification system in use there, since they were prepared to allocate six columns in the tabulogram to synthesize the notation, seemed to be a tool of some refinement. Their statement that the

allocation of subject headings was the difficult part seemed to her to be a statement of intellectual humility by people who seemed both to know a great deal about what they were doing and to be in the vanguard of workers in the field. They had mentioned Ranganathan in the context of compiling their classification. If this meant that they were applying a faceted classification to mechanical retrieval and were actually getting somewhere with it, they were a long way ahead of many people.

Mr Sewell said that he had been particularly concerned to discover whether the Russians punched information home at plant level in an industrial information service. A mass of printed material came down through the *sovnarkhozy*, but the shooting of selected information to selected personal targets within an industrial group by re-copying it and abstracting it did not occur. The party had visited only three industrial plants, but, because of the hurry, it had been difficult to discover certain important things. The ball bearing factory had a simple classification. He stressed that one would have to spend about ten days at a works to find out how they operated, and whether scientific inquiries were put to the information service.

Mr Arnold supported Dr Francis's suggestion that a small team be sent to study Russian progress on information retrieval by machines. His impression was that the type of questions asked and the statements made showed much forward thinking, but the party had not been invited to go behind the scenes and see what was being done. The party obtained several indications of where research was going on. The Russians were probably doing much fundamental thinking in one or two centres at present and not worrying about trying to get anything going at the moment at an advanced level further down the line, because they hoped to make a major break-through. He would not be surprised if the Russians arrived at the answer as quickly as would the British or the Americans.

Mr Liebesny said that it was obvious from the contents of the *Referativnyi Zhurnal* that great stress was placed on the dissemination of material emanating from outside the USSR; at least 50 per cent of its contents was non-Russian material. Had the party any comments on the resultant language problems? Was there much cover-to-cover translation? Was machine translation being used?

Dr Francis replied that the party had no evidence on this, except that the Russians had particularly mentioned that they had difficulty with Japanese, especially in chemistry.

Mr Cleverdon said that although there were many people in the USSR who understood English, it appeared that there was probably a shortage of people who understood both English and technical subjects. There seemed to be a surplus of people on the arts side, which might account for the large staff in many libraries. For instance, at the Lenin Library which dealt with technical subjects, there were 1,700 librarians; very few of these had graduated in technical subjects.

The most advanced work the party had seen was at the Institute of Information of Patents and Invention. They had been told that amongst other interesting activities the Institute was to do machine translation of patents in certain subject fields. It was expected that two hundred patents would be translated by the end of 1963 and the Institute hoped to be translating all British and American patents within two years. In discussion it came out that by machine translation they meant dictionary look-up. In other words, vocabularies were being prepared in narrow subject fields and a computer made a word-for-word translation. These word-for-word translations were then put into correct Russian by technical people who did not know English.

Dr Francis emphasized that the report when published would make it clear that the party had been impressed by the enormous importance the Russians attached to the use of scientific libraries, and the flow of technical information and the way they integrated it with their production plans in industry, but this was not inconsistent with some of the criticisms the party had expressed.

The Chairman, in closing the meeting, thanked the party on behalf of the audience. By their questions and comments the audience had shown that they were very grateful to the party for coming to talk to them.

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